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Foreword

Boy, do we have problems! It seems as though everywhere one turns these days, there are debates and disputes about people, places, and policies. Reports of contention, anxiety, and provocation pour out of the television, radio, internet and print media. All these concerns weigh heavily on our mind, as they do, no doubt, on yours.

I often tell my Composition students that good academic writers have problems—they have to! Without a nagging question or a pressing problem, they would have little of value to say. Problems, properly considered, lead to questions. Questions, properly framed, lead to inquiry, investigation, analysis, or experimentation. And such undertakings can lead to deeper knowledge, thoughtful policies, and data-driven solutions.

We here at the Journal of Student Research have a few problems of our own. One person wondered about the impact of military life on female soldiers, and what such women themselves thought about it, while another wondered what happens to "relationship satisfaction" in veterans, both women and men. Someone else saw the problem—and potential—of making inexpensive, easy-to-build electrical generators for villages in Malawi. Here's another problem: certain dyes in industrial waste pollute rivers; one of our contributors hypothesized that those dyes might be neutralized by using a compound known as "horseradish peroxidase." People often complain that students tend to be apathetic about politics and civic engagement. Someone here stopped complaining and investigated the wherefores and whys of our students' attitudes about the same. It seems we're neck-deep in problems worthy of research—and how exciting that is!

The articles that follow demonstrate that problem-solving is alive and well here at the University of Wisconsin-Stout. Together with their mentors, peers, and research teams, our contributors have demonstrated the spirit of inquiry, the practical tools, the sensible application, and the ethical reasoning that lie at the heart of UW-Stout's polytechnic mission. These students, and thousands like them, are learning to foster the wisdom, sensibility, and hopefulness that will help their generation address, and in many ways, resolve, the many dilemmas that confront our communities, nation, and world. Boy, do we have opportunities!

Production of a journal such as this comes with its own set of problems which, without the help of many, would be insurmountable. I would like to thank Dr. Elizabeth Buchanan and the Office of Research and Sponsored Programs for making the Journal possible, and for the assistance of many there in bringing this volume together. Thanks also to Professor Ted Bensen and the Cross-Media Graphics Communication teams, Elizabeth Kafka's editing classes, and Charles Lume and Alex DeArmond from Art and Design for assistance in assembling this volume from beginning to end.

We proudly present Volume XVI of the Journal of Student Research. We hope you will enjoy it.

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A Closer Look at Challenges Faced by Women in the Military

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Abstract

Research surrounding female service members in the United States military has shown differences in the effect of the military on male and female mental health. However, the reasons for these differences, as well as higher rates of physical injury for women, have yet to be determined. The purpose of this study is to record the challenges faced by women in the United States military, as they themselves perceive them. Qualitative interview data is used to determine whether such challenges differ from those that male service members face, and what might cause any differentiation. Results show that gender discrimination is most commonly a result of the inherent differences in physical capacity for men and women. Mental distress discussed by participants is commonly caused by a fear of such discrimination integrated in the military culture over time. Therefore, perceptions of physical differences correlate with the differences in military experience for males and females.

Keywords: women, military, servicewomen, challenges, discrimination

A Closer Look at Challenges Faced by Women in the Military

Gender roles and differences are highly debated in American culture. A particularly controversial discussion is gender in the military. Prior to a decision made by Defense Secretary Ashton Carter in December of 2015, females were not allowed to occupy combat positions in the military. The decision was finalized in March 2016 that these jobs would become available to women in all branches (Howell, 2016). Despite changes such as this, however, conflict over gender is not confined to the past. Through a qualitative interview study with female veterans and soldiers, we can take a closer look at women's side of the story regarding these issues. This study explores what servicewomen's own perceptions can tell society about the challenges they face in the military. Their perspectives are indicative of whether these challenges are unique to them as females. Several recent studies focus on perceptions and portrayal of women's physical condition and mental health in the military. Among them, few findings have similar results

1 Valerie is in the Honors College of UW-Stout (ED.)

and some directly conflict. While we can conclude that men and women are different, the limits to these differences have yet to be determined by these studies. Due to such inconsistencies, the question remains as to whether mental and physical health is held in the same regard for males and females in the military. Based upon these observations from previous studies, I designed interview questions in an effort to draw more widely supported conclusions.

Controversy over gender equality, or the equal rights and treatment of men and women, is particularly prevalent in the military. However, the workplace is affected by its presence in many other fields as well. While the number of women in the labor force has improved drastically in recent years, sexual harassment in the workplace persists in the United States, as well as unequal pay between men and women. This constitutes gender discrimination (Conley, 2013). Regarding the military specifically, women's roles are becoming increasingly similar to men's. According to Southwell & MacDermid Wasworth (2016), the Women's Armed Services Integration Act of 1948 allowed a maximum of 2% of the enlisted force to be women. The act still excluded women from combat positions. In 2013, the rule was removed by Secretary of Defense Leon Panetta (Nindl, Jones, Van Arsdale, Kelly, & Kraemer, 2016). Southwell & MacDermid Wasworth (p. 1, 2016) reported that "Women will be allowed to occupy positions in direct ground combat units below the brigade level" by the end of 2016. This held true. Women are continuing to advance in the physically demanding aspect of their military roles. This is supported by findings in some literature, but still conflicts with arguments that inherent physical strength prevents women from performing at the same capacity as men.

This concept of inherent differences between women and men is widely debated. A recent study reported that "men in their 20s have 50% more upper-body mass and 30% more lower-body muscle mass", and as a result, men have "greater absolute and relative strength, and a greater absolute and relative anaerobic power compared with women" (Nindl, et al., p. 51, 2016). Relative strength is the amount of strength a person possesses, compared to others with their same approximate body size. Relative anaerobic power is the ability of a person to exert intense spurts of energy for a period of time, compared to others with a similar body size. Nindl, et al. (p. 51, 2016) also found that 36 months of training showed higher rates of stress fractures and other injuries in women. However, men had lower resistance to muscle fatigue than women. Researchers attribute this to scientific study of the high-muscle oxygen demands of a larger muscle (Nindl, et al., p. 51, 2016). Another study supported the findings that injury rates are higher for women, but recommended more research on the conditions under

which women's injuries occur (Segal & Lane, 2016). According to Nindl, et al. (p. 51, 2016), training programs increased the number of pull-ups that women were capable of, demonstrating that they could overcome their naturally smaller muscle mass. Additionally, their research found that women performed better than men in ultra-endurance, or the ability to physical endure for a given extended period of time. These studies suggest that women excel in some abilities, and that while men are indeed stronger as a physical typicality, there are exceptions and other ways that women can compete.

Some would argue that the issue of women's physical capacity overlaps with the topic of vulnerability to sexual assault in the military. According to Weitz (2016), sexual assault prevalence in the military is actually not a product of women's inability to physically defend themselves. Rather, it correlates closely with the societal portrayal of women as sexual prey. Weitz (p. 178, 2016) focuses on "unsupportive or threatening comrades and officers", claiming that "the threat of sexual assault not only operates as a system of control over women's lives, but also serves to reinforce both male dominance and gender binaries". This indicates that discrimination against women is what causes them to feel physically vulnerable to men, instead of a real difference in physical vulnerability. However, around half of these women were not even concerned about sexual assault. Weitz (2016) depicts the issue of sexual assault in the military as unrelated to women's physical capacity. The study neglects, however, to address its own finding that many women claim not to feel physically vulnerable or threatened. Nor does it address claims of inherent differences in physical strength between men and women, which are supported by other research.

The literature also reports inconsistently on military accommodation of women's gynecological and obstetric needs. Availability of feminine products and contraceptives to female soldiers is reported differently between studies. There is also little evidence to show whether women are appropriately accommodated if they become pregnant. One study found that "oral contraceptives are offered at pre-deployment physicals, not only for contraception, but also for menstrual suppression during deployment" (Krulewitch, p. 66, 2016). This is different than results found by Segal & Lane (p. 17, 2016), which show availability of menstrual sanitary items and contraceptives to women "varying by location". They also reported on these issues that "Much of the attention has been negative, focusing on the potential negative consequences of women's gynecological and obstetric characteristics on military performance and organizational readiness". Their study showed that women's "loss time" for pregnancy is required to

be reported by military units, while men's "loss time" for substance abuse or injuries often is not. The study acknowledged, however, that additional research is needed on "the realities of these issues, their effects on women's well-being, and policies and practices that can ameliorate problems" (Segal & Lane, p. 17, 2016). As these studies demonstrate, there is varying evidence regarding the military's tendencies to meet gynecological and obstetric needs, and a need for further research.

Studies did show consistency in the mental impact of the military on genders. Men and women in the military have shown different patterns of mental health concerns. Southwell & MacDermid Wasworth (2016) found that post-deployment, more women reported symptoms of depression, while men were more likely to report problems with alcohol. Additionally, they reported that women showed higher rates of PTSD symptoms than men, after injuries during deployment. According to Segal & Lane (p. 15, 2016) "there are gender differences in the adverse psychological effects of deployment, including increased risk of suicide during deployment among female soldiers". The literature revealed was little information, however, on the relationship between female soldiers' mental health and the perceived prejudice against them in the military. Studies showed that a lack of social support can cause great mental damage for humans, with brain activity comparable to that of physical pain (Southwell & McDermind Wasworth, 2016). Segal & Lane (2016) found that Iraq and Afghanistan female veterans were "more likely than men to have difficulty transitioning into civilian life, with negative mental health effects and higher unemployment" (2016). It could be argued that the increased mental strain of the military on women is caused by some capacity of ostracism experienced during their service. These results indeed show a difference in coping methods between men and women, but do not determine whether their coping skills reflect their level of pain or the cause for it. Perhaps it is worth exploring the causes for these differences in coping mechanisms, as well as causes of the problems with which service men and women are coping in the first place.

The literature related to military women shows diverse research findings. There is consistency in findings on mental differences between males and females. There are limited findings, however, on the cause for this, as well as for higher rates of physical injuries in women. Few other themes were prevalent among studies, due to the fact that a large amount of research is contradictory on women's access to gynecological and obstetric resources, or on portrayal of sexual assault. Additionally, a more comprehensive review of previous studies might yield clearer findings. Time and resources available for the purpose of this study generate limitations on the size of the literature

review. As a possible result, inconsistencies arise. Some studies found that access to such resources was available consistently, while others found the opposite. Consistently, however, data shows that challenges in the military seem to be more intense both mentally and physically for women than men. The reason for such, however, remains a conflict. Limitations on the breadth of this literature, disagreement between researchers, and lack of attention to causes for their findings leaves the question of whether the military is as attentive to women's mental and physical needs it is to men's. Because of these findings, this study focuses on women's perceptions of the way they are treated during and after their service, and how it affects their personal lives. Focus on this cause and effect relationship may bring society closer to determining the cause of the strain that women seem to experience on such a different level than their male counterparts in the military.

Methods

After obtaining the approval of the Institutional Review Board and consent from participants, I conducted four interviews. All participants met the basic criteria of a female United States soldier or veteran. More specifically, participants included an Army Specialist of the National Guard, a Petty Officer Second Class of the Navy, a Marine Captain and a Marine Corporal. All participants were between the ages of 40 and 50, and retired from their military careers. The Army Specialist worked as an Intelligence Analyst during her service time, a job which consists primarily of gathering and analyzing information on the enemy. She was stationed in Iraq and the United States during six years served. A Petty Officer Second Class, one participant served as an Air Traffic Controller in the Navy. She was responsible for communication with aircrafts from a control tower, and was stationed in California and Florida for the four years that she served. One of the Marines interviewed was stationed at Camp Pendleton in California for all of her four service years, and served as an Air Defense Control Officer, whose duties were similar to an Air Traffic Controller. The other Marine was stationed in a few locations overseas, including Afghanistan and Japan, and served as a Combat Correspondent, similar to a civilian news reporter. She served for eight years, and was the only participant that was ever in direct combat. All four women served prior to the recent changes in physical fitness requirements for women.

Participants each answered the same set of general questions. In summary, these questions sought to determine each participants' branch of the military, how long and where they served, what their personal tasks were, and how their challenges during the beginning stages of the career compared to later ones. Additionally, participants were asked to discuss

whether their gender played a role in their experience at any point, related to treatment by others or their own expectations. This portion of the interview included conversation about sexual harassment or any possibility of violation experienced by participants during service time. Gender neutral questions were intentionally discussed prior to emphasizing gender, in order to avoid framing, or the process of designing a question to produce a specific focus in the answer. Probing questions, or questions that stemmed from individual discussions, depended on the direction of each separate conversation. I analyzed data by recording key words and phrases from participants' on a Microsoft Excel spreadsheet. The key phrases were chosen by identifying any word used or topic covered by at least two participants.

Results

Interviews yielded consistent overall outcomes. Results should, however, be considered exploratory, due to such a small sample size. Participant demographics, such as branch and rank showed no relevance to their responses or the themes derived from them. Regardless of backgrounds, female veterans followed very similar thought patterns. They often even used the same words to answer questions, resulting in the use of key words for data analysis. The popular use of the same terms and lingo is common in the military, which could be a possible reason for the participants' shared language. Analysis resulted in two main themes of the challenges faced by women in the military, both of which pointed to gender stereotypes as a significant issue for women.

Overwhelmingly, women consider their challenges to be associated with physical strength. When asked if they could choose a favorite aspect of their military experience overall, most participants answered that they found it rewarding to overcome the stigma against their physical capacity. One woman stated, "Feeling like I proved myself and did something that people think women can't do was the best part of my experience". Others indicated the same feeling. One veteran commented, "I feel like I proved people wrong", adding that training herself to do pull-ups and pushups "was so satisfying. I know I impressed men in my platoon". Still another told me that she felt like she "overcame a stereo type". With relevance, participants all indicated that they struggled the most during the first several days or weeks upon arriving at a new location, or joining new people in their service time.

Whether in basic training, at Officer Candidate School (OCS), or their first station, a majority of participants indicated at some point that their physical capacity as a female was questioned the most when they were new to a setting. Most of the women used a phrase something along the lines of "I had to prove myself", when describing challenges faced during their initial

stages of training. "I really was treated the way that I proved myself worthy of during boot camp," said one. Another expressed the same feelings, saying, "I definitely earned the most respect when I was able to keep up with the physical pace". Still another woman gave a similar answer. She said,

"I guess any time I entered a new group, whether it was OCS, or my platoon, or anything, I actually thought was when I felt the most intimidated, and had to work the hardest to fit in. It was hard to break into a group, especially because the Marine Corps is dominated by males. I had to show them that I could do it".

All four participants considered it necessary to prove that stereotypes about their gender's physical capacity were conditional. Discrimination was most prevalent in skepticism of female physical ability. Respect is most easily earned if women prove they are an exception to gender stereotypes.

Another predominant theme in my findings was the response to questions regarding women's mental stress, compared to the consistency in women's focus on their gender. Participants claimed unanimously that any mental stress they faced was unrelated to the presence of gender discrimination. Their focus on gender in answering questions, however, raises doubt about the accuracy of this perception. While there was a consensus that stress during service time was not unique to the pressure on women as female soldiers, participants' tendency to relate the entire discussion to their gender demonstrates the intense presence of it as a factor in their memories of service time. One participant, though she stated that her gender did not cause her mental strain, contradicted herself. She said,

"I definitely think that the hardest challenge for me to rise to as a woman was being in shape like men. Not my emotions".

Physical challenges, however, require mental persistence, which causes stress. Noticeably, this participant's own words indicate that the obstacle to which she attributes her hardships was the comparison of herself, as a woman, to men. According to participants, women's mental state during and post-military is not influenced by their gender. However, their attention to their gender, even when it was not a part of the question, indicated otherwise. Another participant stated right out her mentally stressful fear of discrimination. When discussing her mental health and the way it was affected by the military, she said that her fear of discrimination caused her anxiety during her service time. When asked whether any of her challenges were presumably related to gender, she said,

"I think I was a lot more afraid of gender discrimination, than I was reacting to an actual presence of it. My mental health strain was mostly related to fear. Once I had resigned from service, the fear ended. I was never

depressed or hated myself or anything after I was done".

To clarify, I questioned whether she was comfortable sharing if she felt depressed or bitter toward herself before she was done. She answered, "No. But anxious. Very anxious. I was afraid of messing up". I asked her why she was anxious, and she said, "I was afraid people would be right that I couldn't do it because I was a woman".

This participant showed a blatant fear of gender discrimination. Others seem to unintentionally relate their memories and opinions to the way that their gender influenced their military experience. Though some of these references were not in response to direct reference to mental health, it is noteworthy that all of our experiences, including physical challenges, require a thought process. Therefore, they play a role in our mental health. A majority of my questions were not posed in a way that focused on gender, and women still tended to draw attention to the impact of gender with their answers. For example, when asked whether any challenges were presumably related to gender, a participant said,

"Well the first time I remember feeling like I was really noticed and respected was when I outran my first platoon sergeant".

Many others described similar experiences. When asked what challenges they faced during their first stage of military training, a majority of women automatically connected their struggles to the pressure they felt to "prove themselves" as women. When asked about the best part of their experience, participants again brought it back to being a woman, most stating that they found it rewarding to "prove people wrong", or to "overcome stereotypes". Participants felt most accomplished for overcoming stereotypes against women in the military, demonstrating an obvious importance to them of the pressure put on them due to their gender.

The stress of female stereotypes resonated as a theme throughout the entire length of the interviews. However, some discussion focusing specifically on mental health provided possible explanations for stress unrelated to gender. One participant pointed out that she experienced an actual lack of stress, and attributed it to her role in the military. She suggested that stress can be caused by jobs with higher risk than hers, or by facing combat, which not all service members have to do. She said,

"My job had nothing to do with killing anyone, and honestly I was never in a combat situation. I think depression and mental health issues for veterans correlate higher with those types of jobs".

Two other participants stated that they did not credit their gender with any of their mental struggles at all. One attributed some of her struggle to other specific factors. When asked whether her mental or emotional

distress was caused because of her gender, she shrugged and answered,

"I missed my family a lot. That was my most emotional struggle. But I didn't have really any mental health issues that were caused by the way I was treated as a woman".

These examples demonstrate the plausibility that stress in the military does not have to be caused by factors unique to gender. Emphasis on their gender in the majority of their other answers, however, show its prevalence in their mental process when discussing their memories of service time.

Sexual harassment and women's health provisions were also discussed in interviews. Though none of these conversations generated theme key words or phrases, one woman discussed her experience with her menstrual cycle in the Army. Similar to the anxiety that some participants expressed over expectations of them as women, this participant shared that she was very anxious about her menstrual cycle each month. She attributed her anxiety to a lack of resources for disposing of female products, and stated that the frequency of the problem was "very inconvenient". Only one participant shared a story regarding physical violation, and she stated,

"I was never assaulted or consistently harassed. I was nervous about being meat in a world of so few options for my male coworkers, because there were a few catcalls or creepy looks. But I guess I only ever experienced that two or three times from all four years, so I didn't think much of it".

Though the participant was seemingly affected little by the experience, she clearly remembered its occurrence. While the participant herself may not describe such an incident as a significant problem, others may disagree, or even experience worse situations.

For a majority of the discussion, participants claimed that discrimination against gender did not cause them very many problems with physical challenges once they "proved themselves". Women expressed pride and joy over the accomplishment of doing so, and demonstrate that it is possible for women to meet military standards, regardless of gender stereotypes. However, despite of their report that gender did not cause them mental stress during time served, the intensity of their focus on gender's influence when discussing their experience seems to show that these stereotypes did indeed influence them in a way that male soldiers' gender would not. Their overarching feelings about and memories of their military experience seemed to point toward the impact that their gender had on it.

Discussion

According to the results of this study, gender stereotypes in the military regarding female physical capacity causes women to fear failure and feel pressured to overcome expectations that do not exist for males. It

causes women to focus on the way that their gender impacts their military experience more than any other influence. These findings are supported by Victor Vroom's Expectancy Theory of Motivation.

Vroom's theory holds that people will behave in a manner which they expect to produce a certain "reinforcing" desired outcome (Jones, Corbin & Fromme, p. 59, 2001). It seems as though fear and expectations about gender discrimination caused the women in my study to focus primarily on the way that their gender influenced their military experience. Both during their experience, and during the interviews, these women seemed to center their behavior on a desired outcome of overcoming stereotypes and proving that they were an exception to prejudice about women in the military. Evidently, this supports the theory that people manipulate their own behavior to create the reaction which they desire from others. Though participants themselves did not identify their gender as a factor in their mental health condition, their overwhelming focus on its role in their experience illustrated otherwise.

Discussion with participants touched on other unresolved issues in surrounding literature. These topics, however, such as sexual harassment and availability of contraceptives, gynecological products, or obstetric care yielded no consistent results during interviews. A few stories were shared, but due to a lack of consensus, these conversations were not included in themes.

Some additional limitations exist in the implications of study results. It is possible that the research design itself skewed results. Because the implied consent participants received prior to the study described its purpose in such detail, women possibly already assumed that their answers were supposed to reflect the influence of their gender. This is a limitation, however, that cannot easily be avoided without violating ethical guidelines. The sample size also set some limits. Four women is not representative of an entire population. Additionally, a different study might include female and male service members, excluding gender from the title and design of the study's presentation. Challenges discussed voluntarily by both genders would be analyzed this way, instead of focusing on gender at all. It is also worth considering that out of these four women, only one served in combat. Another version of the study focused on mental health specifically might be better structured to focus on a group of females from which all or none were deployed to face combat, for example. This might prevent combat experience from serving as an external variable, which is a factor that would cause the studied variable to be viewed differently than it would be on its own. The elimination of such a variable in a sample could examine whether gender causes mental stress for women, as opposed to the causation of combat trauma.

These things considered, the results of this study cannot necessarily be linked to military women who have served in combat, much less to servicewomen as a whole. These limitations, especially the sample size, minimize the extent to which study results can resolve conflicting opinions about gender in the military. Findings are not completely irrelevant, however, and do contribute to the literature surrounding the effect of servicewomen's gender on their mental health. Results also contribute to further development behind the argument that inherent physical differences between men and women can be overcome. Though all four women indicated intimidation by the military stereotypes on their gender, all four also conquered the challenge.

Conclusion

Studies of women in the military show controversy over inherent physical differences between genders. Cause for women's poorer mental health than men's during and after service is also underexplored. A closer look at challenges faced by women in the military shows that female soldiers are faced with a mentally and emotionally stressful stigma about their physical capacity. As demonstrated by participants, women are capable of surmounting these physical obstacles. However, the relief from the stress of this expectation after finally overcoming it seems to be the most memorable aspect of each woman's experience, indicating that it is a tremendous factor. Women must prove to be an exception to the stereotype in order to earn respect. Awareness of this expectation causes the obstacle to expand beyond physical strength and endurance.

Knowledge of the study's purpose could have skewed results by influencing women to relate the discussion to their gender, even when individual questions were not intended to do so. A revised version of the study might include female and male service members, and focus on general challenges. This would allow for a comparison of the challenges discussed voluntarily by both genders. Another version of revision might focus more specifically on a group of female service members who faced combat, in order to differentiate between mental stress caused by gender and that cause by combat trauma. Results of this study, however, indicate that there are both mental and physical challenges in the United States military unique to female service members.

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The Meaning of Suffering in Literature and Life

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Abstract

Suffering is an inevitable facet of life. All around the world countless numbers of people endure suffering from violence, abuse, natural disasters, and their own vindictive and self-damaging natures. It is difficult to make sense of and find meaning in the seemingly pointless suffering in our everyday lives. This paper explores the meaning of suffering through the lenses of Shakespeare's play *King Lear,* Jane Smiley's novel *A Thousand Acres*, modern psychology, and the survivors of real-world catastrophes. Literature imitates life and by exploring it, along with modern research and real-world survivor testaments, this paper takes a holistic approach to making meaning out of the seemingly meaningless pain and chaos that suffering inflicts. This paper uses a wide array of circumstances and examples to scrape away at timeless questions that are all too often answered by thoughtless clichés.

Keywords: suffering, King Lear, A Thousand Acres, disaster, meaning

On December 26th, 2004, a 9.3 magnitude earthquake tore its way through Indonesia. The massive earthquake triggered a tsunami that this world has never seen before. Waves traveling at six-hundred miles per hour and standing twenty four feet tall tore their way through the cities and villages. The death toll began to pile, expenses climbed just as fast as the waves, and suffering and heartache were in sight everywhere. At the end of the day, three-hundred thousand people were dead, and millions more had their lives forever altered. Suffering was everywhere, and suffering still is everywhere today. Although it may not always be as extreme as it was for the victims of the 2004 tsunami, suffering is perhaps the most universal human emotion and everyone must battle with it on a daily basis. The battle often seems unwinnable, and leaves its victims wondering what the meaning of it all is. However, I believe that is precisely what the meaning of suffering is: its meaning is to make one ask for meaning. The meaning of suffering in personal life is to drive one to find meaning in his/her own life, and it accomplishes this by showing us both what is taken for granted and what is

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truly valuable in life.

Gregory Eels argues in the *Journal of College Student Psychotherapy* that suffering is what unites the human race. He writes, "We are all dislocated in some way in our lives, which is evident in the trauma of birth, sickness, old age, the fear of death, personal weakness, and separation from those we love" (Eels 42). The very fact that we feel, see, touch, taste, love, care, and exist invites the very nature of suffering into our lives. We suffer because we are human and we are human because we suffer. This suffering can manifest itself in different forms in our lives. According to Eels, suffering is often manifested in sickness, old age, personal weakness, and separation from loved ones (Eels 42).

Evidence of the effect of these different types of suffering can be witnessed in Shakespeare's *King Lear*. *King Lear* is a tragedy, a genre that includes a mighty hero or heroine with a fatal flaw that leads him/her to a demise at the play's conclusion. Throughout a tragedy, the main character is subjected to a series of painful and distressing events that leads him/her to the recognition of his/her fatal flaw and also leads the main character to a reversal of their fatal flaw. In *King Lear*, Lear is a powerful king who presents with the fatal flaw of selfish pride. As a result, throughout the story Lear becomes the very epitome of human suffering and he experiences each type of suffering previously mentioned by Eels. Lear suffers from the sickness of what appears to be dementia as he battles with his old age throughout the play. Lear is also constantly being confronted by his own personal weaknesses. This is evident from the very first scene of the play when Lear exiles his favorite daughter Cordelia in a fit of rage, a decision that Lear clearly regrets later. Lear must also deal with the betrayal of his other two daughters, Regan and Goneril, a betrayal that clearly seems to incite his anger to the breaking point. The king's anger is evident in Act 2, Scene 4, lines 280-281, when he lashes out at his daughters, "No, you unnatural hags, I will have such revenges on you both" (Shakespeare 1228). Like the individuals affected by the devastating effects of the 2004 tsunami, Lear must also endure the mortifying terror of a natural disaster. It is clear that Lear's life is full of suffering of all forms, but the real question of the play is whether or not the stubborn king learns anything through his suffering.

In the *American Journal of Bioethics,* Christopher McDougall and Diana Aurenque write, "The most intolerable feature of suffering is not suffering intrinsically, but the senselessness of suffering" (McDougall and Aurenque 35). Suffering is only truly suffering if it is devoid of any meaning or value. If suffering is embraced as an opportunity for an individual to improve, to grow and develop, suffering can have value and as McDougall and Aurenque stated, it is not "senseless". In Jane Smiley's novel *A Thousand Acres*,

a modern adaptation of *King Lear* set on an Iowan farm, one can see just how unbelievably painful senseless suffering is. In Smiley's adaptation, Larry Cook (the Lear character) is presented as a hard, proud man with few to no redeeming qualities. To complicate matters, Larry sexually molests his two daughters at a very young age. Smiley presents Lear/Larry as a true villain in the novel, a character that readers cannot empathize with. *A Thousand Acres* is an adaptation that is even more morbid than the already depressingly tragic *King Lear*. What makes Smiley's novel so dark, is there is no silver lining, no lesson to be learned by Larry. Larry experiences true suffering because he suffers senselessly, without any personal growth and development or repentance. The suffering, weakness, and fragility, are what make us human. What we make of the whole mess all is what defines us.

If *King Lear* is viewed through this same lens of suffering described by McDougall and Aurenque, then the play may not really be all that tragic for Lear after all. The play is usually viewed as Shakespeare's darkest tragedy. As noted by Michael Goldman in *Critical Insights, King Lear* is relentless with its tragic force. Goldman noted that the play beats the reader down with its repetition. Lear is rejected by one daughter, then the other. Gloucester has one eye plucked out and then the other. The words are even repetitive with phrases such as "Howl! Howl! Howl!", "Never, never, never, never, never!", and "Kill! Kill! Kill! Kill! Kill! Kill!" (Goldman). However, I think that if you can look past these elements, *King Lear* can be viewed as a play that depicts Lear's quest for happiness. The play begins with Lear seated on his throne in power, surrounded by his subjects, servants, and all his wealth. This scene on the surface seems to show the power, success, and possibly the happiness of the ruling Lear family. Despite this, a perceptive reader will notice that this is just a façade, and there is trouble brewing beneath the surface. At the onset of the play, Lear only believes he is happy, and that he has found true happiness in his possessions, wealth, and power. As Lear comes to learn, this is not true happiness but is rather a false reality built upon lies and false flattery. The king undergoes this epiphany in Act 3, Scene 4, lines 101-107, when he witnesses Edgar's pitiful state. He exclaims, "Is man no more than this? Consider him well. Thou owest the worm no silk, the beast no hide, the sheep no wool, the cat no perfume. Ha! Here's three on's are sophisticated! Thou art the thing itself; unaccommodated man is no more but such a poor, bare, forked animal as thou art" (Shakespeare 1232). By witnessing Edgar's suffering and through his own suffering, Lear discovers that material possessions mean nothing to him and finally begins to ask himself what the true meaning of life is. Suffering forces Lear to examine himself, something that the king was never forced to do before during his reign of pomp and

luxury. Here the reader can see the now humbled Lear driven to recognize the errors of his previous vanity and pride. The power of suffering as a tool for recognition is clearly evident. However, Lear is a stubborn man and must continue to undergo more extreme suffering and be driven past the brink of madness to finally find what exactly the true meaning of life is. In Act 4 Scene 6 lines 104-105, a defeated Lear is finally humbled: "They told me I was everything. 'Tis a lie" (Shakespeare 1244). The feel-good aspect of *King Lear* is the fact that Lear does in fact find his meaning of life, and in turn, true happiness. True happiness for Lear as it turns out, manifests itself in the love he has for his faithful daughter Cordelia. This is evident in the play in Act 5, Scene 3, lines 8-19, when Lear and Cordelia are apprehended by Edmund and are about to be sent to jail:

> No, no, no! Come, let's away to prison:
> We two alone will sing like birds i' the cage:
> When thou dost ask me blessing I'll kneel down,
> And ask of thee forgiveness: so we'll live,
> And pray, and sing, and tell old tales, and laugh
> At gilded butterflies, and hear poor rogues
> Talk of court news; and we'll talk with them too,
> Who loses and who wins; who's in, and who's out;
> And take upon's the mystery of things,
> As if we were God's spies: and we'll wear out,
> In a wall'd prison, packs, and sects of great ones,
> That ebb and flow by the moon. (Shakespeare 1250)

In Lear's most delusional, broken down, and pitiful state he gives the most beautiful and humanizing speech of the entire play. Here, right before the play's haunting conclusion, Lear has finally found true happiness. His beautiful words show that as long as he is able to spend time with Cordelia, to be with her and love her, he will be happy, even if that shared time is spent together in the stony walls of an unforgiving prison. These words represent the reversal Lear, the transformation from a proud King who cast out his own daughter to a loving father who wants nothing in the world but to hold his daughter and to be by her side. Lear is now prepared to die a happy man; even though he dies holding Cordelia's dead body in his arms. In fact, he is so delusional and so distraught that he still thinks she is alive. He says in lines 316-317, "Do you see this? Look on her, look, her lips, / Look there, look there!" (Shakespeare 1254). I envision Lear dying with a smile on his face, as he has truly found bliss in his final ignorance. It takes suffering of the most

extreme levels to drive a stubborn man like Lear to truly examine himself, to ask himself what the meaning of life is, and then to find it in his final moments on Earth.

Smiley's depiction of the Lear character presents a contrast between the views of suffering in Shakespeare's time and the modern world. Shakespeare presents suffering as a well needed tool, a type of sour medicine that is required to humble the proud and invoke real, drastic changes of character. This viewpoint could have originated in large part to the world at Shakespeare's time being viewed through a primarily Christian lens. At the time, the vast majority of the civilized world was Christian, and Christians viewed suffering in a positive light, as a service performed for the Lord to give him honor and praise. As time has progressed, the world has shifted from this largely unilateral Christian viewpoint. This thought shifting paradigm is presented in Smiley's depiction of Lear/Larry's senseless suffering in *A Thousand Acres*. Smiley presents suffering from more of a secular viewpoint, as a senseless aspect of this world, an aspect devoid of meaning, one that has no ulterior motive or mechanism. However, I believe that when viewed even from a secular viewpoint, Smiley's depiction of suffering through the character Larry, is depressing as well as inaccurate. Suffering is so much more, and is far from meaningless.

Lear is not the only character in the play that is driven to a change of heart and understanding through suffering. This reversal of attitude can also be seen in the characters of Edmund and Albany. Throughout the major sections of the play, Edmund serves as the main villain and he plays the part well because he is so especially evil and cunning. However, in the final scene when Edmund lays dying, he has a change of heart and issues an order to save Cordelia and Lear. Edmund's change of heart may be the result of two factors. Perhaps it was the intense pain of his own death or maybe it was the sight of all the pain around him that evoked empathy in his heart for Cordelia and Lear. Although his order ultimately fails, this small part of the play is very important because it shows that even the most evil character in the play can be driven to redemption through severe personal suffering and through the suffering of others. The same is similar for Albany, who begins the play on the side of the two sisters and Edmund, but as the play progresses and Albany sees all of the destruction brought about by Edmund, Regan, and Goneril, he too, like Edmund, has a change of heart. This displays how the suffering of others, can function in the same as individual suffering. Being witness to suffering evokes empathy and understanding both of which drive one to find meaning. Fultz, Schaller, and Cialdini (1988) noted a similar finding in a study examining the empathy in college students. The study showed that

college students in a controlled environment displayed increased levels of empathy when they observed their peers in a state of suffering. Empathy induced by suffering drove Edmund and Albany to a change of heart, which led to their redemption in the play. Shakespeare uses the characters of Lear, Edmund, and Albany to drive home his theme of redemption. He uses them to illustrate that even the worst of the worst can redeem themselves. The redemption of Edmund and Albany would not have been possible if the characters had not been subject to terrible suffering, which in turn caused them to doubt the meaning of the life they had been living.

The meaning of life is perhaps one of the most clichéd questions that is repeatedly asked in literary works. However, it is important to note that the real answer to this question is very far from cliché. Grady Hugh wrote in *Shakespeare* in 2009 with regard to the topic saying, "Meaning remains an allegory for us a signifier whose signified we have yet to define. But meaning is, precisely, for us to make, in both our present and in our future" (Hugh 159). The answer to the question is far from cliché, and it is far from definite. The answer differs for every individual and is constantly changing throughout his/her life. Therefore, it should be viewed like a puzzle, which constantly requires work to be solved, rather than an answer (Grady). In *King Lear*, Lear, Edmund, and Albany all find their meaning through the same means: suffering and redemption. However, in real life it is up to each individual to find this answer on their own, to experience life's euphoric highs and its spirit-crushing lows. It is up to each person to solve the puzzle of life on their own.

In life few things are either black or white, nearly everything lands somewhere in a gray spectrum. This is also true in *A Thousand Acres*, where I believe that Smiley presents both an inaccurate depiction of suffering through the Larry/Lear character and an accurate depiction of suffering through Rose/Regan. In the play, Regan is presented as an evil woman, with few shred of goodness. During *King Lear*, Regan schemes with her sister Goneril to steal Lear's kingdom and assists her husband Cornwall in tying up Gloucester and plucking out his eyes. Although she is not as evil as her sister, Goneril, in *King Lear*, it is still nearly impossible to any good qualities to Regan. However, in Smiley's novel Rose is a much more complicated character than Shakespeare's Regan. She is realistic, she has lived a life of great suffering both at the hands of cancer and through Larry's sexual abuse. In spite of this, a reader still has a hard time feeling sorry for her, due to her frequently self-serving, pernicious decisions. Rose, like Larry, lives a life full of suffering, and like Larry she is no hero, but the difference between Rose and Larry that makes Rose's story more realistic is that her suffering seemed

to teach her something. On her deathbed, Rose confides to her sister in regard to her father's heinous crimes, "Forgiveness is a reflex for when you can't stand what you know. I resisted that reflex. That's my sole, solitary, lonely accomplishment" (Smiley 356). Rose dies clinging to the fact that she is unafraid and that she never forgave her father. She dies stubbornly, holding onto an unyielding anger straight to the grave. Despite how dark it may sound, Rose found peace in it. I believe this is where Smiley truly depicts real human life. The fact is, suffering doesn't always provide some colossal, life changing epiphany, and sometimes it might not invoke any change at all. Sometimes, all that can be hoped for is to find a sliver, a shred, or any seemingly minuscule scrap of solace that provides peace. Sometimes, like in the case of Rose, that peace can be found in the simple confirmation of a long-held belief.

When I was a kid I fell down a lot. Sure, every young kid falls down. Kids are clumsy, and they are getting used to their bodies; it is nothing unusual. However, my situation seemed to be different. I was constantly stumbling and tripping over my own feet, and it just did not seem to make sense. I was an athletic kid and I excelled in sports. So why did I fall over all the time? It just seemed like I didn't walk quite right. Things started to take a real turn for the worse when my knees began to hurt. Not occasionally, not bumps and bruises, but chronic aches and sharp pains that attacked and pierced as if my joints were sixty years old. When I was in fifth grade, my parents took me to a knee specialist who put me through a gamut of tests. It turned out that my femurs were unnaturally curved, tilted at an odd angle that resulted in an extreme pigeon-toe (an inward turning of the feet): the cause of many twisted ankles and falls. Unfortunately, my hips were also turned at an awkward angle that put enormous stress on my knees. The only real cure was to break both femurs and hips and to realign them. Like most fifth graders I held on to the idealistic and improbable dream of becoming a professional athlete and this news was disappointing. Couple that with the fact that I loved sports more than anything and all that I wanted to do was to fill the shoes of my older brother who was a local sports legend. I found myself completely crushed. Thankfully, my parents refused the procedure. The result was many years of painstaking physical therapy and a handful of other less extreme surgeries down the road. I know I was a fortunate kid. I did not grow up in a place where food was scarce, I had a roof over my head, and I did not suffer a catastrophe on the scale of that of the Indonesian tsunami; however, they were my problems and my suffering all the same. As cliché as it may sound, this suffering really did help me to grow as a person. Suffering induced recognition and reversal in my life in a similar fashion to which it

did the lives of Shakespeare and Smiley's characters. Scholars claim that 'Art imitates life' and in my case and the case of many others, that phrase rings true as I read *Lear* and find myself relating to the tragic king. Much like in Lear's case, suffering gave my life meaning. It showed me what I wanted to do with my life: I wanted to pursue a career as a doctor, one who could devote his life to helping kids who found themselves in the same situation as I did. It helped me realize that my real future in this world was in my head, and that the power of my brain was going to take me much further than the strength of my back or body ever would. Being a cocky teenage athlete made this hard to grasp. Being insanely competitive made it even worse. However, once I fully realized how much further my mental capacities could take me, it made me unbelievably excited for my future. I am not going to say that I solved the grand puzzle of the meaning of life, because to say that as a twenty year old kid is completely ridiculous. However, I can confidently say that my suffering has led me to take a step in the right direction, to at least lay down the first piece to that great big puzzle.

Six years after the tragic Indian Ocean tsunami, a team of professors and scientists led by Asa Roxberg began a project to analyze the emotional well-being and psychiatric state of the survivors of the disaster. The team conducted their work by interviewing the survivors. Some of their findings were about what they expected: all of the survivors still felt a great deal of grief and sadness. Every survivor had lost family members, friends, and nearly all of their possessions. However, mixed into all of the suffering there were, surprisingly, some traces of joy (Roxberg et al.). The survivors said their joy arose from having survived and appreciating what aspects of their lives still remained. The survivors felt pride in the fact that they were able to overcome such a disaster and not be overwhelmed by the grief it caused. The survivors now had a new outlook on life, and a new meaning associated to it. The following quote from a survivor in one of the interviews sums it up very well, "I now try to build a new life. I do not know at all what the substance of this life will be except that it will include human warmth, love and good things" (Roxberg et al. 714). The tsunami inflicted suffering in its most ultimate form on many of its victims. Through that suffering, the survivors were driven to question what the meaning of life truly was. The answers varied among survivors, some said it was family, some said it was friends, some said it was about enjoying life or it was about being kind, while others said religion. The answers vary, but it appears that each survivor has solved the ultimate puzzle of the meaning of life.

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Benefits and Limitations of E-textbook Use

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Abstract

E-textbooks are sometimes known as e-books, digital books, or online textbooks. E-textbooks are a growing alternative to printed textbooks at many academic institutions. At a university like the University of Wisconsin-Stout, where every student receives a laptop computer, it is important to examine how e-textbooks are accepted and how e-textbooks may affect the study habits of undergraduate students. The purpose of this research is to identify students' preference for e-textbooks or analog, printed books, analyze the perception of student benefits and limitations of the medium, and investigate potential impacts of e-textbook use on the academic experience of UW-Stout undergraduate students.

Keywords: academic, benefits, e-textbooks, limitations

Introduction

Students sometimes face the decision of reading either printed textbooks or electronic textbooks. Although printed textbooks are the traditional content-delivery method for many students, e-textbooks continue to grow as an alternative content-delivery method. Gayle Jesse states that an e-textbook is any form of a textbook that is created to be delivered digitally and may be "consumed" (Jesse, 2014, p. 236). E-textbooks are reading materials used for academic purposes, where content is routinely updated (Terpend, Gattiker, & Lowe, 2014). E-textbooks undergo continuous revision cycles with revised editions to provide the most current academic information; hence, e-textbooks frequently require an Internet connection to ensure that updated content is accessible. For the purpose of this research, it is assumed e-textbooks contain the same content as printed textbooks, but students access that content via a device with a video display.

The University of Wisconsin-Stout, located in western Wisconsin, is a polytechnic university that provides undergraduate students with laptop computers. Because each student possesses his or her own laptop, e-textbooks are practical to implement and distribute to students. Whether e-textbooks have a positive or negative impact on students' academic experience should

1 Chang is a McNair Scholar (Ed.).

be a concern for all e-consumers. For classes that offer the option of using printed textbooks or e-textbooks, students should be aware of the factors that one medium–e-textbook or printed textbook–may make one delivery format preferred over the other.

Data for this research was gathered through UW-Stout using a survey software tool called Qualtrics. A population of 579 UW-Stout undergraduate students participated. Questions related to undergraduate students' preference for printed textbooks or e-textbooks were addressed in the survey's set of questions. Further details are described in the Method section.

Literature Review

E-textbooks vs. Printed Textbooks: Preferences from Past Research

The growing availability between e-textbooks or printed textbooks leaves students to consider which is better: printed textbooks or e-textbooks? Globally, studies show that undergraduate students from various universities in different countries prefer printed textbooks over e-textbooks for academic use. For example, a study conducted by the Book Industry Study Group concluded that 75% of 1,428 students from ten colleges prefer printed textbooks over e-textbooks (Baek & Monaghan, 2013). Another study, conducted by Dmitriy Chulkov and Jason VanAlstine (2013), concluded that 77% of 158 students preferred printed textbooks over e-textbooks. Whether the sample population was 1,428 students or 158 students, these relevant studies indicate the reading medium that students prefer.

Undergraduate students, who may be rather new to e-textbooks and more familiar with printed textbooks, often undergo an extended adaptation process as they learn how to use e-textbooks. Although today's undergraduate students completed primary schools that provided printed textbooks for most of their educational years, "57% of all [Swedish] two-year-olds…are using the Internet–most of them on a tablet computer" (Myrberg & Wiberg, 2015). Students who are introduced to tablets and computers at a young age may adapt more easily and quickly to e-textbooks; as more of these students age, they may prefer e-textbooks because of their comfort level with technology.

Robert Stone and Lori Baker (2013) cited that students prefer e-textbooks instead of printed textbooks because the "e-book [or e-textbook] is a better delivery method, not a better way to read" (p. 89). Stone and Baker noted that eyestrain was caused by reading from a video display for an extended period. The electronic method of distributing content to others via the web may be faster and more efficient than a printed textbook format. Theoretically, individuals may be more accustomed to reading on-screen

information for specific, straightforward information, summarized points, text messages, social-media feedback, or email. Nonetheless, there are positive and negative factors that may influence students' preference for one delivery method over the other.

Cost Differences of Printed Textbooks and E-textbooks

Although printed textbooks were significantly preferred by subjects over e-textbooks in multiple research studies, one significant factor is their price (Baek & Monaghan, 2013; Chulkov & VanAlstine, 2013; Falc, 2013; Jesse, 2014; Lim & Hew, 2014; Lyman, 2008; Stone & Baker-Eveleth, 2013; Terpend, Gattiker, & Lowe, 2014). Students purchase e-textbooks, although they prefer printed textbooks, because of price differences. On average, an e-textbook costs approximately half as much as a printed textbook (Falc, 2013; Lyman, 2008). Although printed textbooks can be sold back for cash, the lower initial cost of an e-textbook may cause many students to choose e-textbooks over printed textbooks.

Negative Influences of E-textbooks on Academic Performance

Students express a strong preference for printed textbooks because e-textbooks frustrate students in several ways, including, but not limited to: difficult on-screen notetaking, headache/eyestrain, difficult navigation, long page-load times, and Internet-connection requirements. These issues are foundational in this research study.

Difficult On-Screen Notetaking

The difficulty of notetaking with the e-device is a possible reason that readers prefer printed textbooks over e-textbooks. A survey conducted by Amanda Rockinson-Szapkiw (2013) found that 52.8% of 106 university students took notes on paper rather than the other four listed choices, which were "Not Answered," "I did not take notes from the book," "Type on Word document," and "Write in textbook/Type in text" (p. 264). Students are challenged to adapt to diverse annotation tools from various e-text applications. Depending on the provider, e-textbook tools for notetaking may differ slightly in appearance and function. The process of becoming accustomed to each providers' tool could be time spent reading.

Headaches/Eyestrain

Factors such as the bright light from an e-textbook's display and high pixelation of the screen strain the reader's eye and eventually make the eye work harder to follow the text, often causing headaches (Myrberg &

Wiberg, 2015; Stone & Baker-Eveleth, 2013). Eyestrain caused by reading an e-textbook, especially for an extended period, may lead to the student taking long and multiple breaks to relax the eyes before reading again. A survey conducted by Nancy Foasberg (2011), a librarian at Queens College, found that 63% of 338 participants agreed that eyestrain is one of seven identified negative e-textbook qualities. A temporary condition called "computer vision syndrome" may lead to eyestrain, fatigue, and dry eyes from looking at a device's display for a long period of time (Myrberg & Wiberg, 2015). With e-textbooks, it is recommended that readers view the content from larger screens because larger text and tools are more visible.

Difficult Page Navigation

Page-to-page navigation is identified as a negative issue that may create a struggle for e-textbook users (Hobbs & Klare, 2015). Readers can easily flip to any page of a printed text in a matter of seconds, but e-textbook users must navigate from page to page by repeatedly clicking a button, or by typing in a specific page number to navigate to a particular page; these latter actions take considerably more time. Scrolling from page to page has become a universal page-navigation method for many online users whether they use an e-textbook application, news site, or social media platform, yet, some e-textbooks don't allow scrolling from one page to another page, which is likely easier (Hobbs & Klare, 2015). A third challenge that e-textbook users may encounter occurs when attempting to navigate from one page to another distant page, such as navigating to a glossary or an index page. The e-textbook application may not save, or bookmark, the page from which the user originally navigated.

Long Page-Load Times

The intensive loading times of e-textbook pages may cause users to become irritated and annoyed, especially when a particular page contains content that increases its file size, and, therefore, creates a time lag before the device displays the content. Complex content may cause a page to load at a slower rate–or not at all. These complexities may consist of visual, auditory, cognitive, and speech-dictation features that interfere with the loading of the page (Grajek, 2013). The additional features that are provided by the e-textbook application, such as a text-to-speech function for visually impaired students, may cause the page to take longer to display as the device loads additional information to support such features. Waiting for a page to load may decrease the reader's motivation to read the text, or the student may do something else while waiting, such as browse the Internet, which may distract the reader from reading the e-textbook.

Internet-Connection Requirements

Internet access is a fundamental component of e-textbooks and is a high priority for college students for daily interaction or social media (Bossaller & Kammer, 2014). Whether students access their e-textbook from a tablet or desktop computer, Internet access may be required to use an e-textbook that does not allow downloading. Internet requirements may not be necessary for e-textbooks that are downloaded; however, updated content will be limited (Baek & Monaghan, 2013). Students who connect via a local campus network may have easy access to the Internet and readily find a location with Internet access to facilitate reading their e-textbook; however, if the student travels on a bus, train, or car, Internet access may be limited or nonexistent. Because of the lack of Internet access, students may prefer a printed textbook to read, especially if these students do most of their reading in an area where Internet access is limited.

Positive Influences of E-textbooks on Academic Performance

Students may find e-textbooks to be a burden, given the aforementioned negative qualities. Still, Baek and Monaghan (2013) found that students tend to be more accepting of e-textbooks over an extended period of time, and one or two semesters may not be enough time for a student to develop comfort and user adeptness (Baek & Monaghan, 2013). Undergraduate students who are accustomed to reading course material from a printed page typically need to experience a transition period before they become comfortable using e-textbooks. Although there is a strong preference among students for printed textbooks over e-textbooks, e-textbooks offer multiple features that students view favorably and may enhance their learning. This research studied the favorable qualities of ease of access, ease of reading, ease of page navigation, portability, and printability. These beneficial qualities are described in the following paragraphs.

Ease of Access

Like many screen devices that can access the Internet, e-textbooks can be read nearly anywhere. A study conducted by Hamid Jamali (2009), from the JISC National E-Book Observatory, concluded that the ease of accessing an e-textbook, is considered an advantage by 55% of users. With e-textbooks, accessibility is available wherever an e-textbook reader device is available. Depending on the e-textbook provider, some e-textbooks can be downloaded and read without an Internet connection; others are only web accessible and require an Internet connection to allow interactive and up-to-date features (Lim & Hew, 2014).

Ease of Reading

E-textbook providers continually improve their e-textbook applications. One important tool helping students comprehend readings is the inclusion of an English dictionary that instantly defines words students may not understand (Chen, Fan, & He, 2012). With a click of a button, the reader receives a definition of the specified word. Often, students who read an e-textbook do not intend to read the whole of the course material, but only specific sections. Smaller sections and shorter reading sessions reduce eyestrain. Shorter chapters may make reading e-textbooks easier because text and interactive features provide assistance that a student can access during a reading session to enhance their understanding of the content.

Ease of Page Navigation

Most undergraduate students complete their primary education while reading printed textbooks and flipping printed pages. Students learn to memorize where specific chapters are located or use physical bookmarks. When using e-textbooks, navigation can be completed more rapidly (Lyman, 2008). Students are able to proceed to the next page of content or revert to the previous page, using commands built into the e-textbook software, such as a mouse click. Students can "jump" to a specific page from a current page; for example, students are able to navigate directly from page five to page ten. In addition, most e-textbooks include indices and glossaries. Although viewing two-page spreads may require a larger display, the larger display permits reading with fewer mouse clicks. Those students who use e-textbook page navigation to its fullest, such as jumping from page to page, using the index, or consulting the glossary, may benefit the most from their e-textbook resource.

Portability

Ee-Lon Lim and Khe Foon Hew (2014), researchers at Nanyang Technological University in Singapore, explain portability as "not having to carry heavy printed books around, [and the] ability to store collections of readings in a personalized digital library" (p. 35). The ability to access multiple e-textbooks using a single device and to archive files eliminates the need to carry multiple, printed textbooks to classes or to other locations when studying. A survey conducted by Nancy Foasberg (2011) at Queens College ranked portability as the e-textbook's most valuable factor, ahead of four other choices (convenience, storage, special functions, and text-to-speech) in student's preferences for e-textbooks.

Printability

Depending on the e-textbook provider, the ability to print portions of the e-textbook may be allowed. Students can save paper by printing shorter sections rather than the entire text (Falc, 2013). The ability to print specific pages rather than an entire chapter or e-textbook is advantageous because students print what they want to highlight or annotate, including images, graphs, or other illustrations. David James Johnston and his colleagues at University of Windsor in Canada conducted a survey and concluded that subjects used the e-textbook print option for three reasons: "A general preference for print, difficulty reading and studying from e-textbook, and general preference to have access to both formats" (Johnston, Berg, Pillon, & Williams, 2015, p. 75). With printability, students may print pertinent sections and annotate by hand to fit their comfort (Hobbs & Klare, 2015). Printability allows students to read from printed sheets if they wish, and allows them to make annotations directly on the printed copy. The option of printing may be emphasized by instructors who use e-textbook materials to accentuate the availability of multiple media to facilitate learning. Having the print option allows students to choose the electronic or printed version, whichever best fits the student's need.

Acceptance of E-textbooks

Although e-textbooks compete with printed textbooks for student acceptance, most students may not be ready to accept e-textbooks. For example, a study conducted by Ya-Ling Chen, Sitong Fan, and Zhongyuan (2012), graduate students at Johnson Wales University, concludes that 78% of 80 students "disagreed that e-book would take over traditional print books in the future" (p. 9).

E-textbooks are gaining popularity due to ease of access, ease of reading, page navigation, portability, and printability. On the other hand, e-textbook users also report negative qualities that affect their ability to easily consume e-textbooks: difficult notetaking, headaches/eyestrain, difficult navigation, long page-load times, and Internet-connection requirements. As e-textbook providers continue to improve their interfaces and interactivity, more students may realize the benefits of using e-textbooks and adopt e-textbooks over printed textbooks.

Importance of this Research Paper

This research studies the importance of e-textbooks and how they significantly influence an undergraduate student's study habits. The aforementioned positive and negative characteristics of e-textbooks

are included to illustrate factors that make an e-textbook favorable or unfavorable. The e-textbook medium is continually growing and publishers will compete to enhance and provide their services to more students and universities, expanding as a business and helping students succeed academically as the result. This research aims to identify students' preference for e-textbooks, the benefits and limitations of the medium, and because of those use issues, the potential effects of e-textbook use on the academic experience of UW-Stout undergraduate students.

Method

For this paper, a mixed-model research was conducted by using an investigative survey instrument to gather voluntary response data from subjects. The survey instrument used for this research was Qualtrics, a survey software tool used to create, distribute and collect data.

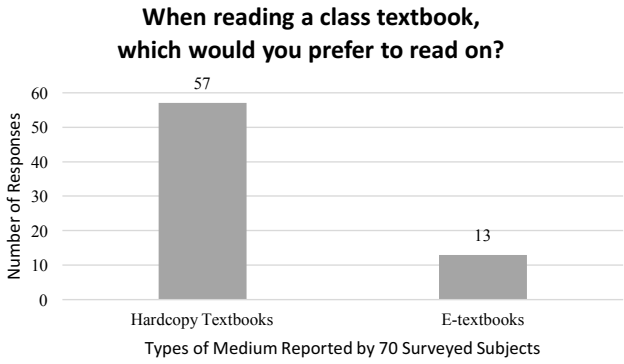
Prior to the distribution of the survey, the researcher submitted the survey and an informational ethics form to the Institutional Review Board (IRB). The IRB ensured the survey followed ethical guidelines and assured that survey subjects were safe from physical or mental harm. After the IRB reviewed and approved the submitted survey, the researcher distributed the survey to 579 UW-Stout undergraduate students via the Planning, Assessment, Research, and Quality (PARQ) office at UW-Stout.

Of the 579 students, 500 students were randomly emailed with the survey by PARQ, and 79 students were emailed the survey by the Cross-Media Graphics Management undergraduate program. The survey was available for response for a period of one month. Two email reminders were sent to each subject, reminding them to complete the survey. After one month, the survey closed and the data was collected and tabulated by the researcher. Of the total survey requests sent (579), 78 surveys were started and 70 of the 78 surveys were successfully completed and submitted within the time period, resulting in a response completion rate of 12%. For results and discussion purposes, the 70 completed responses are referenced with their corresponding results for this review.

The survey conducted for this research consisted of multiple-choice questions, respondents' typed opinions, and a Likert rating scale that included the five chosen e-textbook features that are viewed as beneficial or problematic. The multiple-choice questions attempted to clarify both the subjects' awareness of e-textbooks and their attitudes related to the use of e-textbooks.

Results

Figure 1



Students were presented with a two-choice question asking, "When reading a class textbook, which would you prefer to read on?" The choices allowed were "Hardcopy textbooks" and "E-textbooks." Respondents had a strong preference for printed textbooks at 81.4%, or 57 out of 70 students. A low percentage of 18.6%, or 13 out of 70 students, preferred e-textbooks.

The survey asked subjects to rate five problematic limitations of e-textbooks on a one-to-five Likert scale. A rank of "1" specified the most problematic issue; a ranking of "5" indicated the least problematic. As Table 1 shows, subjects identified headaches/eyestrain as most problematic, followed by Internet-connection requirements, difficult page navigation, difficult on-screen notetaking, and long page-load times.

Table 1

Limitations	Total Respondents	Respondents' Ranking: Most Problematic to Least Problematic →					Weighted Average Of Respondents' Ranking
		1	*2*	*3*	*4*	*5*	
Headaches/Eye Strain	67	31	11	10	7	8	***2.25***
Internet-Connection Requirements	67	16	17	12	15	7	***2.77***
Difficult Page Navigation	67	13	13	14	14	13	***3.01***
Difficult On-Screen Notetaking	67	5	19	18	8	17	***3.19***
Long Page-Load Times	67	2	7	13	23	22	***3.84***

In addition to using the Likert scale, respondents were also provided an opportunity to submit their own typed input related to other problematic features that were not listed among the survey choices. As related to notetaking, subjects specifically noted the absence of an ability to copy and paste from an e-textbook onto another application such as Microsoft Word. Additionally, the distraction rate of using an e-textbook may be higher as

well; some students stated that e-textbooks are "harder to pay attention to since they are on the Internet. It is tempting to go on other websites while doing homework." Another student added that e-textbooks are "hard to focus … [and] get side tracked and distracted easily." User attention span may be lower while reading e-textbooks because of distractions in their surroundings, such as the easy access to other websites or pop-up application notifications. Other respondents negatively described e-textbooks as follows: "Poor reading retention," "Different company with different tools and software. Too much to remember," "Navigation and views not customizable," "Don't work well on mobile devices," and "Inconvenient and use of device battery." These additional, problematic features of e-textbooks are issues that may require consideration to improve the adoption of e-textbooks by students.

Table 2 shows that students ranked the beneficial features of e-textbooks in this order: ease of access (most beneficial), followed by portability, ease of page navigation, ease of reading, and printability.

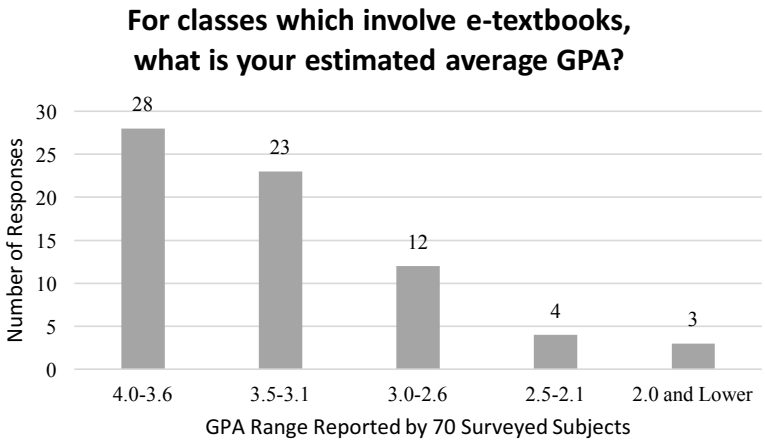
Table 2

Benefits	Total Respondents	Respondents' Ranking: Most Beneficial to Least Beneficial →					Weighted Average Of Respondents' Ranking
		1	*2*	*3*	*4*	*5*	
Ease of Access	68	24	25	10	7	2	***2.09***
Portability	68	22	13	12	14	7	***2.57***
Ease of Page Navigation	68	7	12	24	15	10	***3.13***
Ease of Reading	68	12	11	15	12	18	***3.19***
Printability	68	3	7	7	20	31	***4.01***

In addition to using a Likert scale, respondents were again invited to type their own input related to advantageous e-textbook features. One subject stated that, "The search is a nice feature that you don't get in hard copy books." Another subject concurred about the ease of the search tool: "If I need a certain key word or topic and am having issues finding it, ctrl + f speeds things up immensely." Other beneficial features of e-textbooks also included less "worry about damaging it [e-textbooks] and going to pick it up and return it." A third subject did not "comprehend the information better after reading a book online, compared to a hard copy [textbook]," although this subject did "find it much easier to take notes on the computer while reading an e-textbook." These and other responses indicate that the subjects acknowledge the beneficial features of e-textbooks.

Subjects were asked to report their estimated grade-point average (GPA) for courses that used e-textbooks. More than half of the subjects who responded (70) reported that they earned a GPA of 3.1 or greater. The following figure shows the subjects' reported GPA:

Figure 2



Discussion

At a university like UW-Stout, where students are given a personal laptop to use throughout their undergraduate careers, one might predict that students would favor e-textbooks. However, when asked whether they prefer to read material via e-textbooks or printed textbooks, data shows that the respondents overwhelmingly prefer to read printed textbooks over e-textbooks. This response is similar to a Foasberg (2011) survey that found that 76.5% of survey respondents preferred print materials to e-books or e-textbooks; in the UW-Stout research, 81.4% of the participants preferred to read print materials over e-textbooks. Numerous factors may cause students to prefer printed textbooks over e-textbooks, such as adaptability, the willingness to change reading preferences, cost, age, classroom style (face-to-face versus online courses), features, and more. Depending on the course, students may be unable to choose whether to buy an e-textbook or printed textbook; e-textbook use may be their sole option. Yet, this research shows students strongly prefer printed textbooks.

Ranked as most problematic in this research survey, eyestrain seems to be a physical concern that the majority of the respondents encountered while reading e-textbooks. Although e-textbook-accessible devices do provide brightness adjustments to the video display, the low pixilation of the screen, as well as screen contrast, may cause the reader to feel the effect of eyestrain, leading to headaches that will require taking breaks to relieve the eyes. The researcher's findings indicate that an Internet-connection requirement is a problematic feature related to e-textbooks. Not all e-textbook providers allow downloadable e-textbook content, in

effect requiring an Internet connection to access content; therefore, an Internet connection is a necessity when reading e-textbooks that are not downloadable. As shown by Table 1, page navigation had a balanced ranking throughout the scale. This suggests that some subjects struggle with page navigation while others do not see page navigation as a problem. Lastly, difficult notetaking and long-page load times were the least problematic for subjects. The results suggest that students do not struggle with finding alternatives to notetaking or worry about page loading. The least problematic, page loading, suggests that the subject's Internet connection speed is sufficient to support the content. Audiences of this research paper should consider the five problematic features surveyed in this research when they choose course textbook materials.

According to Grajek (2013), three main factors that concern students or faculty most about e-textbooks are cost, availability, and portability. The findings from this research survey illustrate that accessibility and portability are two important features that influence e-textbook usage. Ease of reading ranked as fourth most beneficial. One should be aware that "ease of reading" does not necessarily correlate or relate to headache/eyestrain in this study, but exemplifies the ease of reading the size of the text on an electronic video display. Although concerns related to page navigation and printability were less significant when compared to the other three features, the ability to easily navigate and print materials for notetaking may also be important for other circumstances, such as students who want to scan from page(s) to page(s) or students who prefer to read a printed text over an e-text. Approximately 46% of subjects stated that printability was not a problem that they encounter regularly. These five chosen features are factors that may influence students' interest in e-textbooks.

Figure 2 illustrates GPAs self-reported by the subjects as related to e-textbook use. As shown by Figure 2, there is no apparent correlation between e-textbook use and negative academic performance. Over half the respondents reported a GPA between 3.1 and 4.0 on a scale of 1.0-4.0. This may imply that students do relatively well while using e-textbooks. The survey question asked for the subjects' "estimated average GPA," the survey results may be skewed or miscalculated by the respondents. Nonetheless, as shown by the figure, subjects appear to perform well academically when they use e-textbooks. There are certainly other factors not addressed by this study that may influence grade outcomes and the use of e-textbooks.

Limitations

The respondents were UW-Stout undergraduate students, which eliminated many potential subjects, including graduate students and other e-textbook users from different universities, colleges, and high schools. The small population for this research shows a result that affected a particular audience, specifically, UW-Stout undergraduate students only. Future studies of e-textbooks may benefit from additional elements with a focus on a particular population, such as gender, learning style (face-to-face or online), age, experience with digital media, course subject, major, e-textbook experiences, grade-point averages, and more. Another significant factor that has been discussed in similar studies–that was not included in this survey–was an e-textbook versus print textbook cost comparison. Numerous other factors that were not surveyed in this research may also influence student preferences for e-textbooks; study of such factors could be addressed in further research.

Conclusion

Since its availability in the late 1990s, the e-textbook medium has grown in popularity among learners of all ages, and particularly among college students. Because technology, such as computers, tablets, and electronic devices, play an immense part in many students' academic careers, e-textbooks provide an alternative content-delivery to printed textbooks. E-textbook publishers are constantly refining e-textbook features to improve user-friendliness. However, this study's findings show that e-textbooks are not preferred by the majority of college students. Printed textbooks are–presently, and by a wide margin–the preferred reading medium for most students. This survey analyzed five beneficial and five limiting features of e-textbooks, confirming that eyestrain is the most problematic feature (of the five choices) for e-textbook users, while ease of access was the most significant positive feature (of the five choices). Although this research does consider factors that may influence e-textbook preferences among students, there may be other factors that were not addressed in this research that may influence students' preferences for electronic texts and printed texts.

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Drivers of Hydroperiod in Ephemeral and Permanent Wetlands

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Abstract

Wetlands serve as a habitat for many different plant and animal species that rely on various hydroperiods to survive. Understanding the influences on hydroperiod may help to compensate for any future loss or changes in hydroperiod due to environmental change. Aspects of wetland hydroperiod (min/max depth, seasonal range, mean periodic (six hours) fluctuation, and maximum periodic fluctuation) were related to explanatory geomorphic variables (surface area to volume ratio, basin size, wetland area, and elevation). Permanent (PW) and ephemeral pond (EP) hydroperiod characteristics were compared for wetlands in Chippewa County, Wisconsin. Pressure transducer data loggers were placed in paired PWs and EPs to collect water depth data. In EPs, canopy cover was negatively related to maximum depth, because trees decrease water depths through interception and/or transpiration. Seasonal range was positively correlated with EP area and negatively correlated to peat depth. Larger EPs may have had a larger seasonal range because they both captured and evaporated more water. EPs in larger basins had both higher mean and maximum periodic fluctuations, because larger basins result in more runoff from precipitation. Range and maximum fluctuation were significantly higher in EPs than PWs. Mean periodic fluctuation was not significantly different because PWs were both filling up and evaporating whereas EPs were mostly evaporating with occasionally dramatic increases due to precipitation. PWs that were smaller and lower in elevation with smaller basins tended to have more variable hydroperiods than larger PWs due to a lack of water storage in the basin.

Keywords: wetlands, ephemeral ponds, hydroperiod

Introduction

Ephemeral ponds (EPs) are defined by the Wisconsin Department of Natural Resources as depressions in forests that contain water after snowmelt and dry out during summer (Epstein, Judziewicz, & Spencer, 2002). The unique characteristics (hydroperiods, size, lack of fish, and forested landscapes of EPs) make them important habitats and breeding locations for

a variety of plants and animals. Some of the organisms that benefit from EPs are sedges, wood frogs, blue spotted salamanders, and many invertebrates including dragonflies, mosquitos, and predacious diving beetles. Due to the array of plants and animals supported by EPs, they also contribute to the biodiversity of the forested landscape.

The hydroperiod of an EP is the length of time the pond contains water, from the time it fills (usually from snow melt in the spring) to the time it dries up, typically in midsummer (Brooks & Hayashi, 2002). The length of the hydroperiod can vary significantly from pond to pond, based on several hydrologic characteristics. This discrepancy in hydroperiod between ponds is important as it provides multiple varying habitats for the occupying organisms. Snodgrass, Komoroski, Bryan, & Burger (2000) found that different hydroperiod lengths support different sets of species, meaning that short and long hydroperiods cater to unique sets of organisms.

Despite their contributions to biodiversity, the hydroperiods and general water depth fluctuations in EPs remain understudied in comparison to those of permanent wetlands (PWs). Colburn (2004) proposed a general classification scheme for EP hydroperiods, including variation in duration and seasonal timing in water retention, but has little detailed quantitative data. In addition, few studies examine factors that influence EP hydroperiod (drivers). Brooks and Hayashi (2002) found only weak relationships between wetland hydroperiod and morphological features, such as basin depth and maximum volume. They suggested that features such as groundwater connectivity and evapotranspiration should also be investigated. Interannual weather variability in snowpack, mean groundwater levels, and precipitation influence EP hydroperiods (Brooks, 2004), but do not explain why different EPs and PWs in the same local area have different hydroperiods and water depth fluctuations. No study explicitly compares water depth fluctuations in EPs to those of PWs.

The specific objectives of this study included understanding how wetland hydroperiod characteristics vary between PWs and EPs, and discovering what environmental and landscape-level factors had the most influence on wetland water depth and water depth fluctuations. We hypothesized that drainage basin size, elevation, canopy cover, and peat depth would influence wetland water depth and fluctuations, and water depth fluctuations would be greater in EPs than in PWs.

Methods

Site description

Wetlands were located in the Chippewa Moraine State Recreation Area (45° 13′ 13.32″ N, 91° 24′ 39.7″ W) in Chippewa County, Wisconsin. This area contained many forested wetlands that were formed during the Wisconsin Glacial Episode. We studied 11 wetlands, five which were wet the entire year (PWs) and six EPs. In order to better compare wetlands with similar geomorphic and local climate settings, a majority of the wetlands were grouped into five pairs of adjacent PWs and EPs, each pair of wetlands is contained in the same system (area of forest). One system did not contain any PWs so only one EP was studied from that system. All wetlands were located within a 20 km^2 area (Figure 1).

Figure 1.

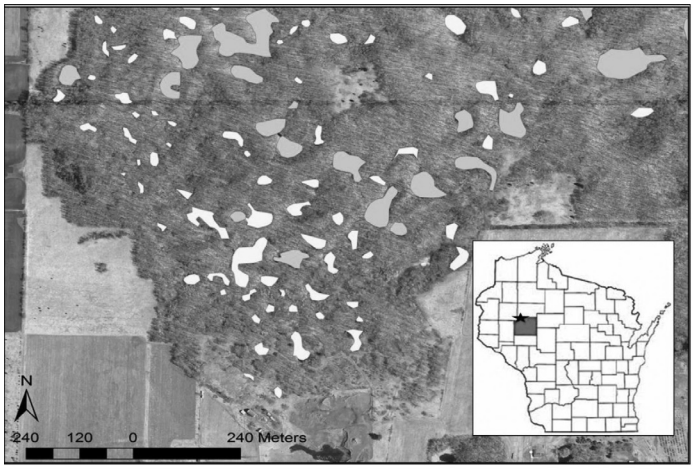

Figure 1. Map identifying a portion of wetlands used in this study (based on aerial photographic interpretation, the yellow spots are ephemeral wetlands and the blue and green spots are permanent wetlands), including a map of Wisconsin with Chippewa County identified in red and a black star over the study sites.

Data collection

HOBO pressure transducer data loggers (Onset Corporation, 2015) were used to record water depth fluctuations. One HOBO logger was installed above water to measure the barometric pressure. The loggers measured water pressure, which was then converted into water depth by correlating readings with actual water depth measurements, using HOBOware (Onset Computer Corporation, 2015). Water depths

were logged in six hour increments over the course of about five months (4/23/2015 – 10/17/2015).

We collected a large suite of environmental data in order to determine effects on hydrology. Area of basin, wetland, and elevation were calculated using ArcGIS (ESRI 2014). We assessed canopy cover using spherical densiometers and peat depth using soil probes.

Data analysis

The hydrologic variables processed from the HOBO logger data were mean periodic (six hours) fluctuation, minimum and maximum depths, maximum fluctuation, depth range, mean positive and negative fluctuations, and numbers of rising and falling increments. Mean periodic fluctuation was defined as mean change in water depth per six-hour increment. Minimum and maximum depths were the shallowest and deepest depths in the wetlands, respectively. Maximum fluctuation was the maximum change in water depth per 6 hour increment. Water depth range was calculated by subtracting the minimum water depth from the maximum. Mean positive and negative fluctuations were found by taking the average of the positive (water-depth increase) and negative (water-depth decrease) periodic (six hours) changes in water depth. The numbers of rising and falling increments were simply calculated by counting all the time intervals in which the water depth increased or decreased since the last reading.

Due to small sample size, we did not perform inferential statistics to assess statistical relationships between environmental factors and hydrology. However, we do describe the most important patterns and trends. Because we hypothesized that hydrograph variability would be higher and water depth lower in EPs, we used one-tailed t-tests to compare hydrologic variable means between EPs and PWs.

RESULTS

HOBO logger data show trends between EPs and PWs in paired wetlands. Hydrographs show higher water depth and greater stability of water depth in PWs than in EPs (Figure 2). Some EPs (Figure 2B – D) had negative water depths below ground level, indicating the ponds had gone completely dry.

Figure 2.

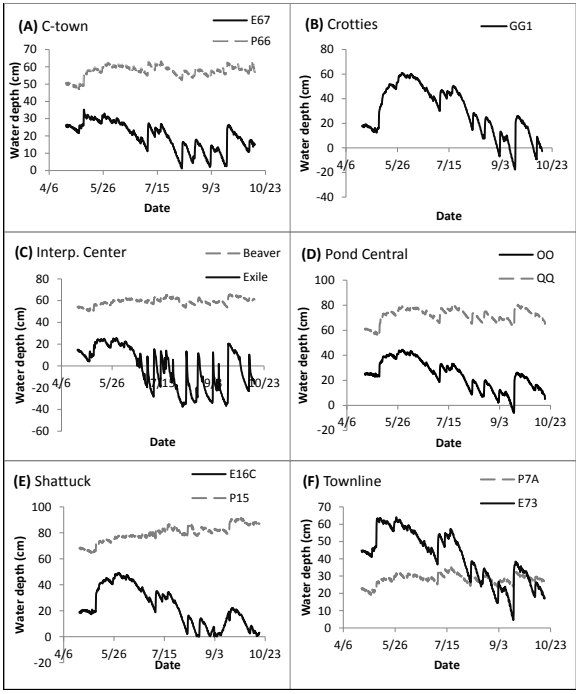

Figure 2: Paired wetland hydrographs. Ephemeral ponds are represented by solid black lines and permanent wetlands by dashed gray lines. A – F show the water depth by date in the six different wetland systems. Negative numbers indicate water depths below the ground surface.

Unsurprisingly, the minimum depth was significantly lower in EPs than in PWs (Table 1), although the maximum depth was not significantly different (P= 0.057). As expected, the range in depth was significantly larger in EPs compared to PWs (Table 1).

The maximum water depth fluctuation was significantly higher in EPs than in PWs (Table 1). The mean periodic (six hours) fluctuation was noticeably different between EPs and PWs, but was not significantly different. Both the mean positive and negative periodic fluctuations were not different. However, the numbers of rising and falling increments were both significantly different; EPs had fewer rising and more falling increments, while PWs had more rising and fewer falling increments (Table 1).

Table 1

Hydrologic Variable	EP	PW	P - value
Minimum depth (cm)	-9.3 (6.5)	47.1 (7.6)	<0.001
Maximum depth (cm)	46.6 (6.0)	67.3 (9.5)	0.057
Range depth (cm)	55.9 (6.1)	22.2 (2.5)	0.001
Maximum fluctuation (cm/hr)	4.15 (0.83)	1.29 (0.20)	0.010
Mean periodic fluctuation (cm/hr)	0.15 (0.03)	0.09 (0.05)	0.069
Mean positive fluctuation (cm/hr)	1.25 (0.39)	0.55 (0.02)	0.066
Mean negative fluctuation (cm/hr)	0.74 (0.98)	0.61 (0.05)	0.137
# of rising increments	274 (23)	368 (13)	0.004
# of falling increments	417 (21)	319 (11)	0.002

Table 1. Comparison of hydroperiod characteristics between permanent and ephemeral ponds. Negative numbers indicate water depths below the ground surface.

Although we investigated all possible relationships between our explanatory and hydrologic variables, we here report on only those showing major trends. In EPs, canopy cover was negatively related to maximum depth (Figure 3C). Seasonal range in EPs had a positive relationship with EP area (Figure 3B), but little relationship to mean peat depth (Figure 3A). For EPs, mean and maximum periodic water depth fluctuation and basin (watershed) size were positively related (Figures 3F and 3D). PWs had a negative relationship between mean periodic fluctuation and elevation (Figure 3E).

Figure 3.

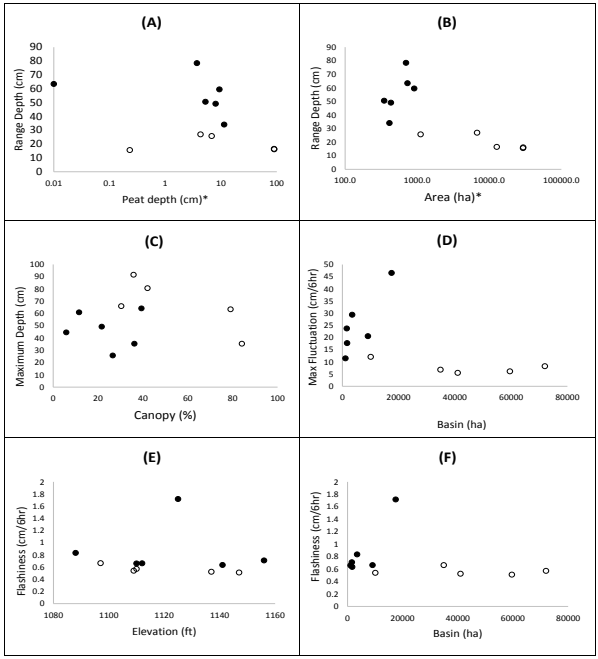

Figure 3. Scatter plots of a variety of explanatory variables and hydroperiod characteristics for relationships with important trends. Ephemeral ponds are represented with black points and permanent wetlands with white. *Axes are on a log scale.

In EPs the rising and falling increments were more dependent on the surface area to volume ratio (Figure 4A) and percent canopy cover (Figure 4C) of the wetland than in PWs. Surface area to volume ratio and canopy cover had positive relationships with the frequency of falling increments. A weak positive relationship was found between basin size and number of falling increments, (Figure 4B) however, this is likely dominated by one pond.

Figure 4.

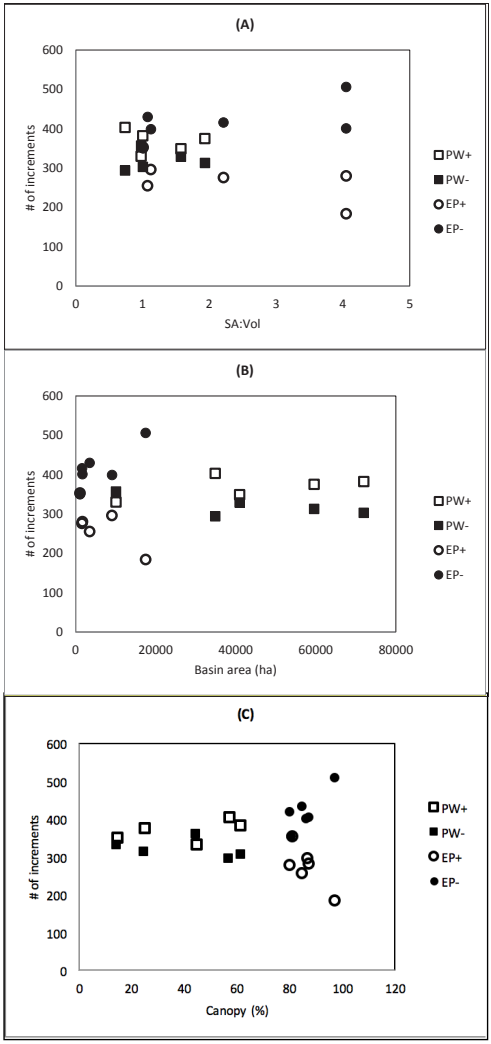

Figure 4. Scatter plots comparing the numbers of rising and falling increments to multiple explanatory variables. PW and EP indicate permanent wetland and ephemeral pond, respectively. + and – indicate rising and falling, respectively.

Discussion

Ephemeral Pond and Permanent Wetland Comparison

In almost all the hydrographs (Figure 2), water depth was clearly lower in EPs than in PWs, with the exception of E73 and P7A (Figure 2F), possibly due to peat accumulation and peat mat formation in P7A. This is consistent with Colburn's (2004) definition of vernal ponds: that they are shallow and their depth peaks in the early spring at about 1 m of water. The PWs tended to have deeper peat, a larger basin size, smaller canopy cover, and larger wetland area, which may have contributed to the higher water depth (Figure 3). The differences in water depths observed on the hydrographs are most likely due to a combination of multiple environmental and landscape characteristics. EPs have more variable hydroperiods than PWs. Both EPs and PWs were affected by the same rain events and drying periods in a relatively small geographic area; however, EPs had higher mean periodic fluctuation. This variability may be due to many of the same environmental characteristics affecting water depth.

EPs had greater seasonal range than PWs (Table 1). Since EPs have a higher perimeter: area ratio, they are more affected by transpiration from surrounding trees (Calhoun & deMaynadier, 2008)). Transpiration may also be affecting ground water, causing decreasing flow into EPs. This wetland water loss may be why seasonal range is much higher in EPs than in PWs. In addition, because HOBO loggers measure water depth at a single location rather than water volume in the wetland, the hydrographs are not completely representative of exactly how much water is gained and lost in a wetland. Although wetlands of different sizes may gain the same depth of water, a wetland with a larger volume gains a larger amount of water than a smaller wetland with the same water depth measurement increase. Evapotranspiration from EPs would result in greater water depth decrease than a similar volume leaving PWs through evapotranspiration. This fact may contribute to the significantly greater seasonal range in EPs.

The high mean periodic fluctuation within EPs may be due to increased response to precipitation, which may have resulted from separation of the wetland from the groundwater table. This can happen when the wetland is "perched" on an impermeable layer, such as clay. These wetlands were formed as a result of melting ice fragments from glaciers, so they may never have been dependent on the larger regional groundwater pool. In these

cases, the only water input into the wetland is precipitation and surface runoff. The water then leaves the wetland through evaporation or transpiration (Brooks & Hayashi, 2002). Due to this dependence on precipitation events, it is possible for these ponds to completely dry and be refilled multiple times throughout the summer. This unique hydroperiod provides habitat for plant and animal species that are not supported by ponds that dry once a year (Colburn, 2004), and is demonstrated most clearly by "Exile" (Figure 2C).

Although both mean positive and negative fluctuations were not different, the numbers of rising and falling water depth increments were significantly different between EPs and PWs (Table 1). Water loss was more frequent in EPs while PWs had more instances of water gain. We expected this for multiple reasons. The more frequent water loss in EPs could be due to the lower water depths, which means higher temperatures and more evaporation. Another explanation for the water loss in EPs could be the higher number of surrounding plants transpiring water out of the wetland. The water depth increases in the PWs may be because PWs receive more precipitation with each rain event due to their larger sizes and larger watersheds.

Environmental Drivers

Because larger wetlands have the opportunity to both capture more direct rainfall and evaporate more water due to higher surface area, larger EPs tended to have larger seasonal ranges. However, this relationship is only important for EPs. PWs often have a larger area than EPs but a much lower seasonal range, which indicates that there are many other important contributing factors determining seasonal range for PWs.

EP seasonal range is also affected by peat depth. Peat accumulations may decrease the seasonal range due to the water holding properties of peat (Boelter, 1968). Since peat can store water for the wetland, it may be less likely for a wetland with large amounts of peat to lose water due to infiltration into the groundwater or evapotranspiration. However, this relationship is circular in that the deep peat depth is also a result of the low seasonal range of some wetlands. Peat requires an anaerobic environment to form. A wetland with a high seasonal range may become too shallow to provide the right environment for peat to form, making a relatively "stable" water depth a good characteristic for forming peat. There was no relationship between peat depth and water depth fluctuations in PWs, which could be a result of peat stabilization in higher elevation wetlands and groundwater stabilization in low elevation wetlands with little peat.

Basin size influences the mean periodic water depth fluctuation of an EP. Similar to the impact on the maximum fluctuation, this could be due to an

increase in runoff from precipitation. In PWs, as the elevation increases, the mean periodic water depth fluctuation decreases. Higher elevation wetlands also tend to have smaller basin size, making the pond less influenced by precipitation events.

The rising and falling increments tended to be more dependent on pond morphology in EPs than in PWs. In EPs, a higher number of falling increments was common in ponds with a larger surface area to volume ratio (Figure 4A), perhaps due to the large surface area providing more opportunity for evaporation. Another factor influencing the frequency of falling increments is the percent canopy cover of the EP (Figure 4C). As the canopy cover increases the number of falling increments also increases. The canopy may be intercepting rainfall causing rising increments to be more uncommon, while the increased plant life may be causing water loss due to transpiration.

Some of our wetlands, such as QQ, may be semi-permanent. Two years of above-average antecedent precipitation may have caused the regional groundwater table to rise, resulting in some of our study sites intersecting the local groundwater table.

Future studies should investigate groundwater storage. Continuing the study in more normal precipitation years would provide data that could help explain how changes in precipitation patterns affecting the regional groundwater table might alter the hydrology of EPs. These data could also be used in understanding the differences of hydrologic characteristics when the ponds do and do not intersect the groundwater table. In order to help support some of the speculations made here, other hydrology measurements should also be studied in future years, including evaporation and transpiration rates, precipitation gauges, volume of runoff, and interception by trees.

Understanding which environmental characteristics have the most impact on wetland hydrology can serve as an important consideration when determining conservation techniques. Many of the plants and animals that inhabit wetlands are dependent on the length of hydroperiod (Snodgrass, Komoroski, Bryan, & Burger, 2000). If drivers of hydroperiod were better understood, we could better predict which wetlands would have hydroperiods that benefit the most diverse or high priority set of plant and animal species.

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Exploring the Relationship between Superstition and Defensive Pessimism

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Abstract

This study examines the relationship between superstitious beliefs and defensive pessimism. Superstitions are beliefs or rituals that help control stress and increase positive or reduce negative outcomes (Vyse, 2014). Defensive pessimism is a coping strategy that helps control fears and anxieties during performance by analyzing every scenario that could go wrong in order to prepare and harness one's energy to produce positive outcomes (Norem, 2001). Participants were recruited via Facebook to complete survey measures of both factors. Results of a Pearson's r correlation revealed that a positive relationship exists between defensive pessimism and superstition, however this relationship was only significant for women. Future studies should examine this relationship to determine if the two work synonymously or independently of one another to reduce anxiety or enhance performance.

Keywords: defensive pessimism, superstitions, correlation

Exploring the Relationship between Superstition and Defensive Pessimism

When placed in a stressful situation, the brain actively begins to identify ways to diminish the impact that these stressors have on one's life. In some cases, this happens through the use of coping mechanisms. One such mechanism is the implementation of rituals, or superstitions, which help them to gain a sense of perceived control over the situation (Lazarus & Folkman, 1984). For example, a former third baseman for the New York Yankees, Wade Boggs engaged in numerous rituals prior to each game. The first thing Boggs would do on game day was eat a meal of chicken. Then he would move on to the following extensive rituals:

Ending his grounder drill by stepping on third base, second, and first base taking two steps in the first-base coaching box and jogging to the dugout in exactly four strides. He never stepped on the foul when running onto the field and always stepped on it on his way back to the dugout. At

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precisely 7:17 P.M. he ran wind sprints in the outfield, and when he finally stepped into the batting box he drew the Hebrew word יח in the dirt with his bat (Vyse, 2014, p.4).

Each of these rituals was performed with the intention of gaining control over his upcoming game performance.

While some may turn to superstitions to create a sense of control, others may resort to other types of coping behaviors, particularly in situations in which someone is trying to avoid failure. For example, some individuals attempt to anticipate every possible negative outcome that could occur in a situation. This negative thinking then results in a set of actions to reduce the likelihood of any of those negative outcomes to occur. This strategy is known as defensive pessimism (Norem, 2001). Like the superstitious person, the defensive pessimist feels as though their strategy helps them feel more in control of the end result, regardless of a negative or positive outcome (Martin, Marsh, Williamson, & Debus, 2003).

Both of these two coping strategies help prepare an individual for events and to avoid failure. They believe that those rituals or strategies enhance their performance resulting in higher rates of success. Given these similarities, the purpose of this study is to investigate whether the people who believe in superstitious rituals are also the same people who would enact defensive pessimistic planning strategies or if these two strategies are used independently of one another.

Superstition

To be superstitious is to have a fear of the unknown, and use faith in magic or luck to control the unknown (VandenBoss & American Psychological Association, 2013). A superstitious person believes that certain actions, events, or objects will bring about good luck (e.g. finding a four leaf clover) or help them to avoid bad luck (e.g. not allowing a black cat to cross your path) (Wiseman &Watt, 2004). Superstitions typically surface when a person feels distress and lack of control over their environment (Jahoda, 1969). When these situations arise an instinctive urge to control one's situation surfaces (Lazarus & Folkman, 1984). In order to gain a sense of control, individuals may employ superstitious rituals (Dudley, 1999; Keinan, 1994; Malinowski, 1954). The type of environment does not seem to matter, when someone feels out of control, the natural tendency is to find a method to regain control within the current situation.

Superstitions have been recorded for thousands of years and currently exist within many cultures (Jhoda, 1969; Hamerman & Morewede, 2015; Kramer & Block, 2008, Vyse, 2014). Some superstitions may be found across

different cultures; however, there are many superstitions that are unique within specific cultures. For example, in the Trobahin tribes in Melanesia, Malinowski (1954) observed that the women in these tribes utilize rituals to enhance their crop yields. Another example of this would be the use of the mezuzah in the Jewish culture. The mezuzah, is a tiny scroll that is supposed to be placed on the door post of one's home. Touching it and then kissing your hand is believed to bring good luck. The impact of this ritual was examined on Israeli students (Siniver & Yaniv, 2015). The students performed better on an exam when they were allowed to perform the ritual of kissing a mezuzah when entering the room than students who were not allowed to exercise their ritual (Siniver & Yaniv, 2015). Regardless of the culture, many groups of people use superstitious rituals as a way to produce a desirable result.

Superstitions have been observed in many different contexts such as school and athletic performance. Within an academic context, superstitious rituals have been commonly found to occur when students are in high stress situations, such as when studying for or taking an exam (Gallagher & Lewis, 2001; Siniver & Yaniv, 2015; Vyse, 2014). A recent study by Rudski and Edwards (2007) found that students are more likely to utilize superstitions when they feel the need to gain a sense of control over their anxiety, stress levels, or performance on a task. Superstition has also been extensively studied within the athletic community (Cibrowski, 1997). For example, in studies using basketball players, it has been found that free throw performance suffers when players are unable to implement their rituals (Czech, Ploszay, & Burke, 2014; Lobmeyer & Wasserman, 1986). Similar performance benefits from ritual use have also been found amongst collegiate golfers (Christensen & Smith, 2015).

Additionally, some studies have found that there may be gender differences in the use of superstitions (Auton, Pope, & Seeger, 2003; Wiseman & Watt, 2004). For example, Lobmeyer and Wasserman (1986) found that women, more so than men, reported that their superstitious rituals contributed to their success at a free throw task in basketball. Superstitions may affect anyone, but past research has found it to be more common in women. It has recently been found that superstitions may help a person regain control of a situation and improve performance during stressful times. Next, the similarities between defensive pessimism and superstitions are examined.

Defensive Pessimism

Defensive pessimism is a two faceted self-protection strategy used to manage anxiety and improve performance (Norem, 2001). The first facet regards the negative expectations regarding the possible outcomes. The

second is rumination, otherwise known as the thinking through all of the possible outcomes and then identifying situations to each of those possible outcomes (Lim, 2009; Norem et al., 1993). Students are often the subjects in studies on defensive pessimism and student performance. Therefore, this act of planning often results in a student who may think about all of the possible things that could result in failure on an exam. For the defensive pessimist, they will then turn this negative thinking into an action plan to make sure that outcome does not occur. For instance, a student who thinks about failing a big exam will plan extra study times, make additional notecards, and will most likely bring more than one pencil on exam day to make sure they are prepared.

Individuals who use this strategy harbor anxiety and often feel out of control. In order to control for this, they will set low expectations for themselves in their planning, even if they have done well in previous similar events. By reducing expectations and anticipating obstacles, people who use defensive pessimism seem to motivate themselves, reduce anxiety, and reach their goals effectively (Norem, 2001). For example, Lim (2009) conducted a study on students in Singapore and found that students who scored higher on defensive pessimism also possessed a higher need for achievement and were more likely to be successful. Interestingly, similar to some of the research regarding superstition, this study also found that women were more likely to acknowledge a defensive pessimistic approach. While interesting, this finding has not been consistently noted in the defensive pessimism literature (Norem, 2001).

Defensive pessimism is a cognitive coping strategy which is present only when the person needs to use it. For example, when a defensive pessimist is in a familiar setting, it may not be necessary to use a coping strategy, because the situation has a familiar comfortable feeling and does not require the use of a coping mechanism (Cantor, Norem, Niedenthal, Langston, & Brower, 1987). After interviewing defensive pessimists and individuals with depression, Showers and Ruben (1990) found that a defensive pessimist does not feel long-term anxiety as a result of a stressful situation. Once the stressful event has passed, the defensive pessimist typically resorts back to a normal level of anxiety.

The thought process of the defensive pessimist is important to their success. It helps them to gain desired control over situations which makes anxiety more manageable, and they will feel more confident that the outcome will be favorable even if the opposite may be true (Langer, 1975; Presson & Benassi, 1996). For example, nursing students who were able to reflect on their progress on a regular basis reported feeling less anxious and more in control of their success (Norem & Illingsworth, 1993). Similarly, numerous studies have found that inhibiting the use of a defensive pessimistic

strategy may hinder performance. If defensive pessimists were placed in a situation which did not allow them to use their coping mechanism, then their performance suffered (Norem & Cantor, 1986; Rich & Dahlheimer, 1989). Furthermore, a final study found that a defensive pessimist needs time to go through the motions of their coping mechanism. When the defensive pessimist was not allowed the necessary time to feel like they have gained control of a situation then performance suffers (Norem et al., 1993).

Current Study

Looking at these two bodies of literature together, it can be seen that superstitions and defensive pessimism have many similar attributes. Both are coping strategies that are used in times of uncertainty to reduce stress and enhance performance. No previous research has studied the relationship between superstitions and defensive pessimism. Given the numerous similarities between superstition and defensive pessimism, it is hypothesized that the reporting of superstitious beliefs will positively correlate with defensive pessimism. Additionally, the current study re-examines the belief that females will embrace more superstitions than males.

Method

Participants

A total of 365 participants responded to this survey study. The range of ages of the participants was quite broad, ranging between 18 and 77 (M = 39; SD = 10.87). A total of 82.8% of participants were female, and the remaining 17.2% were male. Of the 365 participants, 92.9% reported that they were Caucasian, 0.3% Black or African American, 1.7% American Indian or Alaska Native, 1.7% Asian, 0.3% Native Hawaiian or Pacific Islander, and 3.1% of the participants chose other. Participants were recruited via Facebook postings on the researchers' Facebook pages. Participation was strictly voluntary: no compensation was given for participating in this study.

Materials

Participants utilized a personal electronic device, such as a smart phone, laptop, tablet, or personal computer to access the Qualtrics hosted survey via a link on Facebook. Participants were asked to complete the survey on their own time, so no devices were provided by the researcher.

Measures

The Defensive Pessimism Questionnaire.

This scale has twelve items asking participants about the types of defensive pessimism behaviors they exhibit (Norem, 2007). This survey

contains a Likert type scale rating with seven response options 1 (*Not at all true of me*) – 7 (*Very true of me*). Example items from this survey include questions such as "I often start out expecting the worst, even though I will probably do OK" and "Considering what can go wrong helps me to prepare." In the current study, Cronbach's alpha was .87.

Superstitiousness Questionnaire.

This scale has eighteen items which ask participants about the superstitions that they possess (Zebb & Moore, 2003). This survey is based on six response options (0 = *Strongly disagree*, 1 = *Moderately disagree*, 2 = *Slightly disagree*, 3 = *Slightly agree*, 4 = *Moderately agree*, 5 = *Strongly agree*). Example items from this survey includes questions such as, "I have a lucky number" and "I believe that seeing a black cat will bring me bad luck." In the current study, Cronbach's alpha for this scale was .91.

Procedure

An invitation for the study and link to the survey was posted on the researchers' Facebook pages with a brief description of the study. Participants were able to access the survey in the comfort of their own home on a personal electronic device. After the participants gave informed consent, the survey began. All of the questions were administered in the same order for each participant. First they were asked demographics, followed by the defensive pessimism questionnaire, and then the Superstitiousness Questionnaire. The survey lasted no longer than ten minutes. Once the participants completed the survey they received an automated thank you and a request that they share the link with others.

Results

The purpose of this study was to examine whether a positive correlation exists between defensive pessimism and superstition. Since previous research has identified gender differences for superstition, a set of two-tailed independent sample t-tests were conducted to examine whether any such differences existed within the current data set for both measures of superstition and defensive pessimism. The means and standard deviations for the men and women's scores on each of these scales can be found on Table 1. In accordance with previous research, it was predicted that women, relative to the men, would report higher agreement with the superstitious statements (Wiseman & Watt, 2011). As predicted, the results of an independent sample t-tests indicated that men were less superstitious than women when responding to the Superstitiousness Questionnaire, $t(306) = -3.70$, $p < .001$, $r^2 = .33$.

Table 1

		Mean	Standard Deviation
Defensive Pessimism	**Male**	4.38	0.87
	Female	4.29	1.20
Superstitiousness	**Male**	1.60	0.64
	Female	2.13	0.97

Table 1. Means and Standard Deviations of Defensive Pessimism and Superstition Measures by Gender

Next, an independent samples t-test was conducted to examine the relationship between reported levels of defensive pessimism between men and women. No significant difference was found, $t(314) = .47$, $p = .638$.

Given that there was a significant gender difference in the responses for the measures of superstitions, the correlational analyses to examine the link between superstitions and defensive pessimism were conducted separately, for men (see Table 2) and women (see Table 3). Looking at these results separately, an interesting dichotomy arose. Specifically, for males, the correlation between defensive pessimism and superstitions was not present. For females, however the relationship between defensive pessimism and superstition was positively correlated, $r\ (249) = .21$, $p = .002$. Thus the hypothesis that defensive pessimism and superstitions would be positively correlated was partially supported. Specifically, the predicted relationship was found for women, but not for men.

Table 2

	Variables	1	2
1.	**Defensive Pessimism**	-	
2.	**Superstitiousness**	-.10	-

Note. *p<0.05 level, two-tailed. **p < .01 level two-tailed.

Table 2. Correlations between Defensive Pessimism and three measures of superstition (for men).

Table 3

	Variables	1	2
1.	**Defensive Pessimism**	-	
2.	**Superstitiousness**	.21**	-

Note. ** p < .01 level two-tailed.

Table 3. Correlations between Defensive Pessimism and three measure of superstition (for women).

Discussion

The purpose of the current study was to examine the relationship between superstitions and defensive pessimism. It was found that defensive pessimism and superstitions were positively correlated; however this relationship was only found to be true for women. In general, women endorsed superstitious beliefs more so than men, which is consistent with previous findings (Keinan, 1994; Lobmeyer & Wasserman, 1986; Wiseman & Watt, 2004). A statistically significant difference between males and females on the defensive pessimism measure was not discovered, and both females and males scored high on the defensive pessimism questionnaire.

The results are not surprising given that both defensive pessimism and superstitions seem to be cognitive coping strategies. A careful examination of previous literature indicates that both superstitions and defensive pessimism allow a person to manage stress and regain control of their situation, which allows for the possibility of enhanced performance (Lim, 2009; Norem et al., 1993; Roney & Lehman, 2008; Siniver et al., 2015).

There are a number of limitations to consider when examining the results of this study. First, the sample had a narrow participation pool and was bound to the confines of Facebook users whom had access to the researchers' Facebook pages. Furthermore, the survey was administered by a snowball technique and was subjected to issues of convenience sampling. Additionally, response bias and self-selection bias must be considered. For example, some participants may have been more or less inclined to participate because superstitions were mentioned in the invitation. For some the topic may have been intriguing, while for others listing that topic may have caused a negative reaction, disinclining them to participate. For some who responded they may not want to admit to their own superstitions, or may not be aware of the frequency in which they act upon of some of the

rituals identified in the survey. It is possible that they feel embarrassed by them or may become worried because the act of participating in a survey on superstition could invite a positive or negative situation to happen. On the other hand, others may shy away from participation because they believe it would be bad luck to discuss their superstitions. The act of acknowledging a superstition may be superstitious in itself.

Future directions for this research should further examine the connection between defensive pessimism and superstition. Specifically, is there a causal relationship between the two, such that females use superstitions to manage defensive pessimism or vice versa. Exploring how these two variables relate to anxiety and neuroticism may also be beneficial.

Anxiety is a common theme in both the defensive pessimist and the superstitious person. A link between superstitions, anxiety, and anxiety disorders has already been found (Zebb & Moore, 2003). Additionally, Auton and colleagues (2003) have identified links between neuroticism and superstitions. It is possible that all of these items are linked and would bring a better understanding to the subject of trait anxiety. It may help the mental health professionals better understand how to help their clients work through stressful situations. Learning about the strategies may lead to developing methods of teaching their clients that using a coping strategy can be helpful. The end result of this education may reduce the reoccurrence of the out-of-control feeling that some might feel.

The findings from this study suggest that at least among women, if one is likely to think in a defensive pessimistic, it is likely that they may also be more prone to utilizing superstitions as well. By learning that these two strategies work in tandem as opposed to alternative coping strategies that different individuals might adopt, this opens the door for future research questions to identify just how these coping mechanisms may work together

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The Influence of Personality and Military Membership on Relationship Satisfaction

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Abstract

Purpose: Previous research has shown that men in the military have less relationship satisfaction then civilian men, regardless of being married or not (McLeland & Sutton, 2005). Other research has shown that military training does change service members' personality (Thoemmes, Jonkmann, Lüdtke, & Trautwein, 2012). The purpose of this study was to see how United States military service members' relationship satisfaction changes between the time before they enter into service and during their time in service, as well as to examine the relationship between personality and relationship satisfaction in the military population. **Method:** Sixty-nine participants took an online survey through Qualtrics that assessed their personalities and relationship satisfaction using the OCEAN.20 Inventory and ENRICH Assessment. **Results:** Results showed no significant correlations between personality characteristics and relationship satisfaction or between the two different time points.

Keywords: relationship satisfaction, military, personality, veterans

The Influence of Personality and Military Membership on Relationship Satisfaction

Marriage satisfaction in the military is a very well researched area and so is military personality, but intimate relationship satisfaction, regarding all types of relationships, not just marriage, does not have a lot of research (McLeland & Sutton, 2005; Karney & Bradbury, 1997; Burrell, Adams, Durand, & Castro, 2006; Schaffhuser, Wagner, Ludtke, Allemand & Luedtke, 2014; Karney & Bradbury, 1997; Claxton, O'Rourke, Smith & Delongis, 2012). The combination of intimate relationship satisfaction and personality in the military is another topic without much research. The purpose of this study is to bridge the research gap between all different types of intimate relationship satisfaction and service member's personalities. This study will also look at how the personalities of service members change between the time before they enter into service and during their time in service.

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This change may affect how they view their satisfaction in their intimate relationships. The knowledge of how personality changes and how this change affects relationship satisfaction could be applied to future military marriage courses, which could include the pre-marriage courses required to be taken for military members to get married, as well as marriage counseling.

Military and Relationship Satisfaction

Many studies have been conducted looking into relationship satisfaction; some of which have even been done for military marriages (McLeland & Sutton, 2005; Karney & Bradbury, 1997). Most of the studies on military marriages have been from the spouses' (usually women) point of view about the relationship. Not very many have been from the service members' viewpoint of the relationship. A survey study conducted by McLeland and Sutton (2005), was trying to find a relationship between military status, marital status and relationship satisfaction in men. The results indicated that men in the military (married and non-married) had less relationship satisfaction than civilian men. Relationship satisfaction was the same regardless of being married or not. Deployment also had a significant impact on relationship satisfaction with the military participants, in which those who were notified about deployment had lower relationship satisfaction (McLeland & Sutton, 2005).

Other factors that can affect military relationships are ones that are part of military life, which normally do not apply to civilians (Burrell, Adams, Durand, & Castro, 2006). These factors include deployment, changing bases, living away from family, living in a different country, getting married at a younger age, and long separations (Burrell et al., 2006). Since these factors are so different from civilian life, Burrell et al. (2006) conducted a study to find how much the four factors impact military families (Burrell et al., 2006). The results found that fear of spouse's safety negatively affected three factors, mental and physical health and military satisfaction. Moving also had a negative relation to military satisfaction, but was positively related to physical and mental health. While mental and physical health, marriage satisfaction, and military satisfaction were negatively related to separation and living in a foreign country (Burrell et al., 2006).

Another unique aspect of military lifestyle is the training service members receive. Military training is either basic training or boot camp, depending on the military branch. During training, individuals are put through three months of physical and mental tests, to develop the skills for military life. One study conducted by Jackson, Thoemmes, Jonkmann, Lüdtke, and Trautwein (2012) looked into the relationship between military

training and personality over time. Researchers found that participants who joined the military scored lower on agreeableness, openness, and neuroticism than the civilian participants.

Vickers, Hervig, Paxton, Kanfer, & Ackerman (1996) also found neuroticism was significantly lower after training and consciousness was significantly higher, while the other three Big Five personality scales were not affected (Schult & Sparfeldt, 2015). Bradley & Nicol (2003) also found a change that may be consistent with military situational factors with officer cadets in the Canadian military. The personality scores that they found were lower after four years in the military were sense of surgencey, achievement, consciousness, internal control, adjustment, agreeableness, and dependability (Bradley & Nicol, 2003; Schult & Sparfeldt, 2015).

Personality and Relationship Satisfaction

Relationship satisfaction and personality influence one another in different ways. Each factor of personality has a certain amount of predictability towards the satisfaction in a relationship, being higher on one factor can benefit the relationship and make it stronger or it could make the relationship weak. An example would be with the factor neuroticism, when an individual's score is high on this factor, the relationship satisfaction declines, and vice versa (Schaffhuser, Wagner, Ludtke, Allemand & Luedtke, 2014; Karney & Bradbury, 1997; Claxton, O'Rourke, Smith & Delongis, 2012). In addition to neuroticism, lower self-esteem is also an indicator for lower relationship satisfaction. Schaffhuser and colleagues (2014) conducted a study using 141 heterosexual couples in Switzerland to see if there was a correlation between personality traits and relationship satisfaction and if the relationship would change because of personality changes. Their results show that higher neuroticism and lower self-esteem creates lower relationship satisfaction.

Personality factors that predict high relationship satisfaction include high extraversion, high agreeableness, and high conscientiousness (Claxton et al., 2012; Karney & Bradbury, 1997). A study by Claxton et al. (2012), was conducted to find whether there would be a difference between personality reports from self (intra-couple) and from the spouse. The study was also trying to see if long lasting marriages could predict marriage satisfaction. It was found that, marital satisfaction for the husband was negatively related to neuroticism with intra-couple traits, but not for the wives. This finding means that depending on the participant's gender it could decrease the relationship satisfaction. Another finding that was different between the couples was with extraversion. When the participants and their respective

partners thought they themselves were extraverted, martial satisfaction increased. Agreeableness and conscientiousness predicted martial satisfaction for the husbands and wives, while openness to experience only did for the wives. These findings a relevant to the current study, because depending on the gender of the participant their view of the relationship satisfaction and personality could change the relationship satisfaction. An example would be if a participant was male, his view of the relationship could decrease the satisfaction then if they were female. Another example is if that same male participant viewed himself as extraverted, he would have a higher view of his relationship satisfaction.

The lack of previous research including non-marital romantic relationships and their relationship satisfaction along with personality has led to the current study. The current study adds to the existing body of knowledge by including how veterans' relationship satisfaction changes over time as well as how personality affects relationship satisfaction. The purpose of this study was to use survey methodology to examine how the personalities of service members change between the time before they enter into service and during their time in service. Two hypotheses guided this study: (1) in military relationships, veteran personality affects their relationship satisfaction, either in a positive or negative way; (2) there will be a significant change in relationship satisfaction between the two points in time. These hypotheses were expected because of results found in previous research.

Method

This section describes the participants, the survey instrument used, as well as the procedure for data collection.

Participants

There were 69 participants, whose ages varied between 19 and 74, with the average age of participants being 41.22. Most of the participants were male (76.7%). The ethnicity of the participants consisted of Caucasian (81.2%), African American (1.4%), Hispanic (1.4%), and both Caucasian and Hispanic (1.4%). Out of the 69 participants, the majority were from Wisconsin (89.8%), while the others were from Minnesota (5.1%), Virginia (1.7%), Idaho (1.7%), and Arizona (1.7%). The relationships of participants included 70% that were married, 13.3% were in a relationship, 10% were single, 5% were living with another person and 1.7% were divorced.

The military demographics showed that 25.4% of participants were currently in the military, while the other 74.6% were not. The majority of participants were in the Army branch (50%), while the Air Force branch

comprised 18.3% of the sample and Marine Corps had 18.3% and the Navy branch consisted of 13.3% of participants. Over half of the veterans had been deployed (65%), and of those, many were deployed only once (71.8%), while some had been deployed six or more times (5.1%). The average time that the participants were deployed for was 19.89 months.

The sample of veterans was a convenience sample chosen primarily through a university veteran services office and a local county veterans' services office. Other data was also collected using a social media platform, Facebook, as well as through word of mouth, including relatives and friends of the researcher. To participate in the study, participants must have been in the military, and have been in an intimate relationship before and during their service.

Materials

ENRICH Marital Satisfaction Scale. The ENRICH Martial Satisfaction Scale (EMS), has 12 elements, which include idealistic distortion, marital satisfaction, personality issues, communication, conflict resolution, financial management, leisure activities, sexual relationship, children and parenting, family and friends, equalitarian roles, and religious orientation. These 12 elements are broken down between two subscales, idealistic distortion and marital satisfaction. Examples of the 15 items include, "My partner and I understand each other perfectly," for the subscale idealistic distortion and "I am not pleased with the personality characteristics and personal habits of my partner" for the subscale personality issues. The items are rated on a Likert scale from *1 (strongly disagree) to 5 (strongly agree*). Six of the items (two, five, eight, nine, twelve and fourteen) are reverse scored. Previous research that utilized the EMS showed the internal reliability of the measurement was 0.86 (Fowers & Olson, 1993).

OCEAN.20 Inventory. The OCEAN.20 Inventory has five scales, which are openness, conscientiousness, agreeableness, neuroticism, and extraversion. Each of these five scales are measured based on 20 items, four for each scale. Examples of these items include, "I like to keep all my belongings neat and organized," for the subscale conscientiousness and "Kind" for the subscale agreeableness. Examples of the subscale neuroticism includes, "Sometimes I get so upset, I feel sick to my stomach" and the subscale extraversion is, "Most of my friends would describe me as a talker." The 20 items are scored on a Likert scale, from *1 (extremely uncharacteristic) to 7 (extremely characteristic.* Research conducted on the OCEAN.20 to validate the measure found an internal reliability ranging between 0.71 and 0.88 for the five scales (O'Keefe & Kelloway, 2012).

Demographics and qualitative items. The demographic questions gathered information about age, ethnicity, education, location, sex, relationship status, branch of service, pay grade, and deployment experience.

Procedure

A link to the Qualtrics survey was sent via email or the link was provided after a prompt provided on social media. Participants were informed that research was being conducted regarding intimate military relationship satisfaction and personality, and that participants were being recruited to take a ten to 15 minute survey. Participants were able to take the survey at their own convenience, and could take it anywhere they felt comfortable doing so. Participants were first asked three questions, (1) "if they were ever or are still in the military"; (2) "are they currently in the military"; (3) "if they were in a romantic relationship before entering the military". Then they were prompted with questions from both the OCEAN.20 Inventory and the EMS, which was completed in a continuous period, one right after the other. After complenig the first three questions, the particpatns who met the criteria were promted with the directions to complete the following statements about themselves, and they were given the OCEAN.20 Inventory. After completing the OCEAN.20 Inventory, the participants were given the EMS twice. First, to measure the relationship satisfaction before they entered in the military, then right after the participants completed the EMS a second time to measure the relationship satisfaction during their time in the military. At the end of the survey, participants provided their demographic information. Participants were also provided with the opportunity to earn an incentive through a raffle, in which they could earn one of two e-gift cards to Walmart for 20 dollars. If participants wanted to enter into the raffle, they were taken to a separate survey to provide their contact information. After participants completed the survey, they were thanked for their time.

Results

In order to determine the participants' personality, their average score for the OCEAN.20 Inventory score was computed (see Table 1). To find each participant's relationship satisfaction score, the percentile score was calculated based on the mathematical guidelines presented by Flowers and Olson (1993). The relationship satisfaction was calculated for both the responses regarding the time before entering the military and the time during military service.

Scale	*n*	*Mean*	*SD*
Openness	68	4.10	1.36
Conscientiousness	67	5.06	1.21
Extroversion	65	3.62	1.34
Agreeableness	65	5.49	.95
Neuroticism	68	3.04	1.37
Enrich Before Entering the Military	29	68.99	44.45
Enrich During the Military	28	41.56	19.77

Table 1: Average Scores for Scales

Hypothesis 1

The first hypothesis, which states that in military relationships, the veteran's personality will affect their relationship satisfaction, either in a positive or negative way. To answer this question, a series of Pearson product-moment correlations were conducted. When comparing personality characteristics to relationship satisfaction before entering the military, no significant results were found for any of the correlations (see Table 2). Similarly, when comparing relationship satisfaction during the time in the military to personality, there were again no significant correlations (see Table 3). However, the personality factor with the strongest correlation to relationship satisfaction during the time in the military was agreeableness, which was approaching significance ($r\,(23) = .39$, $p = .055$). This result shows that there was a trending positive correlation between agreeableness and relationship satisfaction while in the military. Agreeableness was not statistically significant, but it was approaching significance.

Scale	*df*	*r*	*p*-value
Openness	27	-.03	.887
Conscientiousness	27	-.04	.830
Extroversion	25	-.21	.289
Agreeableness	26	-.03	.896
Neuroticism	27	-.30	.110

Table 2: Personality as it Relates to Marital Satisfaction Prior to Entering the Military

Scale	*df*	*r*	*p*-value
Openness	26	-.03	.887
Conscientiousness	24	-.03	.872
Extroversion	23	-.23	.279
Agreeableness	23	.39	.055
Neuroticism	26	-.01	.975

Table 3: Personality as it Relates to Marital Satisfaction During Time in the Military

Hypothesis 2

The second hypothesis stated that there would be a significant change in relationship satisfaction between the two points in time. The results of a dependent *t*-test showed that there was not a significant difference between relationship satisfaction before entering the military (M = 43.98, SD = 16.28) and relationship satisfaction during the time in the military (M = 40.36, SD = 20.31) (t (18) = .92, p = .368).

Discussion

Through the two research questions in this study, a number of findings were explored. The results of the first hypothesis showed that there were no significant correlations between any of the OCEAN.20 personality traits and relationship satisfaction both before entering the military and during the military. When the personality traits were compared to relationship satisfaction during time in the military, there weres still no significant correlations. The only trait that came close the being significant was agreeableness, which had a positive correlation. This means that when agreeableness is high, relationship satisfaction is also high. This result was also found in research conducted by Claxton et al. (2012) and Karney & Bradbury (1997). The results of these studies both found that high extraversion, high agreeableness, and high conscientiousness all predicted high relationship satisfaction (Claxton et al., 2012) and Karney & Bradbury, 1997). Though this result was not significant, a sample size increase may have provided a stronger result.

The results of the second hypothesis showed that there was not a significant difference between the relationship satisfaction before and during the time in the military. Although there was not a significant difference

between the two time points, there was a very small decrease in relationship satisfaction, with a decrease in relationship satisfaction during the time in the military. This could mean that there is some relationship between participation in the military and relationship satisfaction. Again, more participants would be needed in order to explore this further.

Limitations

The largest limitation of the current study was the small sample size, which was around 19 participants. Secondly, there were complications regarding participants not answering all the statements in the ENRICH assessment. Participants were provided with a "Not Applicable" option for the statements, as some participants may not have had children with their significant other, and so on. Calculating relationship satisfaction required participants to have answered all of the statements in the assessment, so a small number of participants was utilized in the analyses of the ENRICH scores.

Participants were also chosen via convenience sample, and were primarily residing in the Midwest. This one area does not generalize to every service member in the country. Random sampling of participants from many different areas of the United States would have produced more sound results.

It is also important to note the timeframe that participants were responding to in this study. Participants were first asked to assess their relationship satisfaction before entering the military. This is a retrospective pre-test and post-test, and some participants may have had a strong and recent recollection of their relationship satisfaction before the military, while for others this could be a recollection of 20 years ago or more. Another factor would be if their current relationship were influencing their perception about their past relationship. This could have skewed participants' perceptions to be more positive or negative than they actually were. Secondly, participants were then asked to assess their relationship satisfaction during their time in the military. Again, a large portion of participants were not currently in the military, therefore they had to retrospectively think of their relationship satisfaction, as opposed to actively experiencing the relationship they were in.

Implications and Future Directions

Although this study did not produce any statistically significant findings, there is something to gain from this exploration of military members' opinions and perspectives regarding personality and relationship satisfaction. One implication is finding that agreeableness may be

significantly related to relationship satisfaction (Claxton et al., 2012; Karney & Bradbury, 1997).

Future research should look into what these findings are with a larger, more generalizable sample size of veterans. Using a larger and more generalizable sample size may reveal whether agreeableness is significantly related to relationship satisfaction.

Additionally, future research should focus on seeing what the third variables are when it comes to the changes in relationship satisfaction for military veterans. These third variables could include PTSD, the personality of the significant other who is at home while the service member is away, whether or not and how long they were deployed, and how long they have been in the military (Burrell et al., 2006). Burrell et al. (2006) conducted a study, which found that many of these third variables, such as fear of spouse's safety, mental and physical health, military satisfaction, moving, separation and living in a foreign country, effect military couples relationship satisfaction. Other studies conducted by Schaffhuser et al (2014), Karney & Bradbury (1997) and Claxton et al. (2012) have all found that personality effects relationship satisfaction as well. These factors could be researched using a number of different tactics. Another focus could be on finding out if agreeableness is a predictive factor in relationship satisfaction in this population.

Another direction for future research would be to see if the length of time in the military has an effect on personality or relationship satisfaction, by using a prospective longitudinal study following service members from before they enter boot camp until they leave the military. In addition to the effect of deployments, have on participant's relationship satisfaction or personality, such as location of the deployment, length, and number of deployments. Finally, future studies may include the effects of relationship health training on service members' relationship satisfaction over time.

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Influences on Undergraduate Student Civic Engagement

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Abstract

Civic engagement is essential to a democratic society, yet today's youth seem generally apathetic to the idea. Existing research confirms that civic engagement has been dwindling in recent years, so it is in our best interest to act to encourage future students to become civically engaged (Mahatmya & Lohman, 2012). This research investigates the relationship between gender and factors that influence civic engagement in a sample of college students at a Midwestern university. The purpose of this study was to examine this relationship and use results from this study to inform university students, administrators, faculty, staff, and fellow researchers to incorporate it into current course curriculum and future research. The research question in this study was: "What influences male and female undergraduate students' civic engagement?" We predicted no difference between male and female civic engagement because both have the same components comprising their microsystem, thus the factors that influence students to be civically engaged are the same according to Bronfenbrenner's Ecological Theory of Development (Bronfenbrenner, 1979 as cited in White & Klein, 2002, p. 216). This hypothesis is based upon evidence from both literature and theory. Paper surveys were administered to 12 undergraduate classrooms. Surveys included 12 statements that were evaluated by students on the Likert scale. Support for the hypothesis is mixed with statistically significant differences for four of the 12 variables. Implications for practitioners include gender specific teaching about civic engagement. Future research would benefit from a random national sample with supplemental qualitative interviews to understand lived experiences.

Key words: Civic engagement, social responsibility, citizenship, undergraduate students.

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Civic engagement is essential to the democratic society we live in; today's youth, however, seem generally apathetic to the idea. Existing research confirms that civic engagement has been dwindling in recent years, so it is in our best interest to act now to encourage future students to become civically engaged (Mahatmya & Lohman, 2012). For this study's purpose, we followed the American Psychological Association's use of Michael Delli Carpini's (former Director of Public Policy at The Pew Charitable Trusts) definition, "Individual and collective actions designed to identify and address issues of public concern" (American Psychological Association, 2015). The lack of civic engagement in college students is of national concern. In every presidential election in past 48 years, young adults ages 18-24 have voted at lower rates than any other age group (File, 2014).

Purpose Statement

The purpose of this study was threefold: to examine the relationship between gender and influences on civic engagement with a sample of undergraduate students, to develop a reliable survey instrument to measure those influences, and, that the results from this study would inform university students, administrators, faculty, staff as well as fellow researchers to incorporate civic engagement into current course curriculum and future research. The central research question in this study was: "What influences male and female undergraduate students' civic engagement?" We predicted there would not be a difference between male and female civic engagement because males and females have the same components comprising their microsystem, thus their influences to be civically engaged are the same according to Bronfenbrenner's Ecological Theory of Development (Bronfenbrenner, 1979 as cited in White & Klein, 2002, p. 216).

Theoretical Framework

The theory used to inform this study was Ecological Theory of Development, which assumes that individuals are at the center of a multi-layered system (Bronfenbrenner, 1979 as cited in White & Klein, 2002, p. 216). The individual's development is impacted through the interactions of the various layers. The microsystem contains the innermost relationships including caregivers, peers, teachers, workplace, and neighborhood. The next layer, the mesosystem, describes the interaction between relationships in the microsystem. The exosystem contains institutions that affect development but have no direct interaction with the individual. Finally, the macrosystem, which includes the larger societal and cultural influence on the developing individual. As applied to our study, Theory of Development

would predict that the greatest influences on civic engagement come from the microsystem because development is a result of the interactions between the individual and their immediate surroundings (Bronfenbrenner, 1979 as cited in White & Klein, 2002, p. 216). Additionally, males and females have the same components comprising their microsystems, so theory would predict influences on civic engagement to be similar for both genders.

Literature Review

Literature was found using the EBSCOhost online database with the initial search limited to the United States, published within the past 10 years. After difficulty identifying relevant literature due to a lack of studies looking at undergraduate students' civic engagement, we expanded our search to North America and Europe. Of the five articles selected, one is from the United Kingdom, two are from Canada, and two are from the United States. The literature considers both service learning and political engagement (Weerts, Cabrera, & Mejías, 2014; Mahatmya & Lohman, 2012; Stockemer 2012; Gallant, Smale, & Arai, 2010; Lopes, Benton, & Cleaver, 2009).

Weerts et al. (2014) conducted a study that looked at different categories of civically engaged college students. Students' attitudes toward engagement played a role in their categorical placement. Types of engagement varied from political, pro-social, a combination of the two, or non-engaged. Non-engagers were students who were considered spectators, and made up 25% of the sample. It was also found that college students' involvement tended to align with their major studies and professional career interests.

Another study from Mahatmya and Lohman (2012) emphasized the significance of considering multiple contexts and demographic influences when studying civic engagement. This study examined influences from the neighborhood, family, and school. They found that influences on civic engagement varied across neighborhoods, gender, and race. The study found that females were more civically engaged than males. In line with their predictions, gender, race, family structure, and parent education all had a significant influence on adults' civic engagement.

Stockemer (2012) studied political engagement, a form of civic engagement in students at the University of Ottawa. Stockemer found that just over two-thirds of students surveyed voted in at least one election as compared to the Canadian average of only 41% of young people voting in an election. It was also found that students first develop an interest in politics, which then transforms into political engagement. Factors identified to impact political engagement included student's major, academic standing, year of

study, and whether or not the student pays for their own tuition. Two less influential factors included work experience and whether or not the student's parents have been politically involved.

A study by Gallant et al. (2010) looked at the implications of mandatory community service in high school and the effect it had on later service and civic engagement. Gender and religiosity were found to be significantly related to ongoing community service. The study asserted the notion that high quality volunteer experiences can instill a sense of civic responsibility and contribute to continuing volunteer work. Gallant et al. (2010) concluded that the current mandated service-learning curriculum in Canada is not long enough to promote significant behavioral change but is a good beginning.

Research from Lopes et al. (2009) assessed students' existing knowledge of political systems, their interest or disinterest in politics, benefits of volunteering, and personal efficacy to determine the likelihood of future political and civic participation. It was found that one's attitude toward the benefits of political participation was most strongly related to future participation. Personal efficacy was slightly less related, though important in determining future participation. Researchers hypothesized a strong link between knowledge of political systems to future participation, but there was no significant relationship found. Female students and students with higher socioeconomic status showed higher levels of intended future civic and political participation. The researchers remarked that taking into account student's ways of engagement as well as their attitudes toward engagement might be warranted in future studies.

Method

Participants

This study was conducted at a Midwestern university. The participants were male and female undergraduate students enrolled at the university. Demographic data on the sample is found below in Table 1:

Table 1

GEN	Male: 154 Female: 128 Self Identify: 1 Missing: 2
AGE	18-19: 116 20-21: 112 22-23: 36 24-25: 11 25+: 7 Missing: 3
MAJ	Undeclared: 49 Business Administration: 22 Psychology: 19 Construction Management: 17 Hotel, Restaurant, Tourism Management: 16 Other: 162
CLS	Freshman: 75 Sophomore: 89 Junior: 62 Senior: 47 5+: 10 Missing: 2
RAE	White: 250 Black or African American: 6 American Indian or Alaska Native: 1 Asian: 17 Native Hawaiian or Pacific Islander: 1 Self-Identify: 8 Missing: 2
AHI	Under $10,000: 33 $10,000-$14,999: 10 $15,000-$19,999: 11 $20,000-$29,999:14 $30,000-$39,999: 22 $40,000-$49,999:18 $50,000-$74,999: 41 $75,000-$99,999: 53 $100,000-$149,999: 40 $150,000 and over: 27 Missing: 16
PLE	Some High School: 5 GED: 6 High School Diploma: 43 Some College: 57 Associate's Degree: 34 Bachelor's Degree: 91 Master's Degree: 43 Doctorate Degree: 5 Missing: 1

Note: (GEN)= Gender; (AGE)= Age; (MAJ)= Major; (CLS)= Class Status; (RAE)=Race/Ethnicity; (AHI)=Annual Household Income; (PLE)=Parent Level of Education.

Research Design

The purpose of this non-random survey research was to evaluate influences on civic engagement of male and female undergraduate students and examine gender differences. A cross-sectional research design was used in order to examine the influences on participant civic engagement at one point in time. Paper survey questionnaires were used for data collection in order to meet strict coursework deadlines, sample data availability, and convenience. The sample consisted of 285 male and female undergraduate students enrolled in a Midwestern university. The sample design used in the study was purposive and non-random to be inclusive in the classroom. This study used snowball sampling design; we networked through personal connections with professors to acquire appropriate samples. The Institutional Review Board (IRB) approved this study and ethical protection of human subjects was provided through the completion of the IRB's Human Subjects training.

Data Collection Instrument

Survey statements were developed by reviewing civic engagement literature and Bronfenbrenner's Ecological Theory of Development. The survey included a brief description of the study, definition terms not commonly known, risks and benefits, time commitment, confidentiality,

voluntary participation, contact information of researchers, supervising professor, IRB administrator, and instructions for completing the survey. The survey consisted of seven demographic questions regarding the participants' gender, age, major, class status, race/ethnicity, annual household income, parent level of education, 12 closed-ended statements based on a 6-point Likert scale, and an open ended question for further comments. Content and face validity were demonstrated through statements that were produced from reviewed literature and theory to accurately evaluate undergraduate students' influences on civic engagement.

Procedure

The survey process began by emailing nine university professors to explain our research and asked them to collaborate with us by allowing their class to be surveyed. Purposive and snowballing sampling designs were used to select the samples. Purposive sampling was the best fit as it allowed for equitable numbers of male and female student response. The survey questionnaire was sent to all participating professors for their review. The professors cleared the survey for distribution. Five professors responded to our email with permission to survey their students. Data collection began November 5, 2015 and ended on November 16, 2015. The survey questionnaire was administered to all students present in each of the 12 classrooms surveyed. The name and purpose of the study was introduced, making it clear that participation in the survey was voluntary. We read the implied consent aloud including the description of the study, risks and benefits, time commitment, confidentiality, right to withdraw, and IRB approval statement. We then left the classroom so students did not feel obligated to participate. We instructed that completed surveys should be placed in the provided folder. The completed surveys were kept securely in a locked file cabinet in an office on the university campus until data analysis could be completed.

Data Analysis Plan

The data was first "cleaned" and checked for missing data. Surveys with missing data were excluded from the sample. Analysis was based on male and female gender differences; therefore, not included was one respondent who self-identified their gender and two who did not identify their gender. For participants who circled more than one survey response, the higher numbered response was selected. All variables were subjected to frequency distribution analysis. Results indicated that there was no missing data. The "cleaned" surveys were then coded using acronyms for each variable.

Each demographic variable was given a three letter acronym: (GEN) Gender; (AGE) Age; (MAJ) Major; (CLS) Class Status; (RAE) Race/Ethnicity; (AHI) Annual Household Income; (PLE) Parent Level of Education. Each survey statement was also given a three letter acronym: My family has influenced me to be civically engaged (FAM); My friends have influenced me to be civically engaged (FRI); My school provides resources for me to become civically engaged (SCH); Participating in student organizations or clubs on my campus is important to me (SOC); My religious community has influenced me to be civically engaged (REL); I believe volunteering is part of being an engaged citizen (VOL); I believe that me, as one person, can make a difference in my community (MEP); American politics have a relevant effect on my life (AMP); I have an understanding of what is happening politically in the United States (USP); It is important to me to keep up with current events through news and social medias (CUE); Voting is a responsibility of U.S. citizenship (VOT); I have the time to be civically engaged (TIM).

The data was analyzed using the computer program Statistical Package for the Social Sciences (SPSS). The individual was used as the level of analysis. Since groups were compared based on gender, the data analysis included frequencies, cross-tabulations, mean comparisons, independent t-tests, and Cronbach's Alpha reliability analysis. The independent variable was gender; the dependent variables were our survey statements.

Results

The research question investigated in this study was: What influences male and female undergraduate student's civic engagement? Independent T-Tests were conducted, significant differences were found in four of the dependent variables: SOC, VOL, MEP, USP. Reliability testing was also completed. Refer to Table 2 below.

Hypothesis #1: We predicted that there would not be a difference between male and female's civic engagement because males and females have the same components comprising their microsystem, thus their influences to be civically engaged are the same according to Bronfenbrenner's Ecological Theory of Development. We found mixed support for our hypothesis since there were statistically significant differences for the variables (SOC, VOL, MEP, USP),. For all other survey responses (FAM, FRI, SCH, REL, AMP, CUE, VOT, TIM) both genders had similar responses and supported our hypothesis. Refer to Table 2 below.

Table 2

Independent T-tests

	Gender				
	Males	Females	t	df	Sig.
Variable					
SOC	3.98	4.41	-2.52	280	*0.012
	(1.43)	(1.39)			
VOL	4.24	4.82	-4.17	280	*0.000
	(1.27)	(1.02)			
MEP	4.34	4.64	-2.02	280	*0.044
	(1.29)	(1.16)			
USP	4.08	3.76	2.24	280	*0.026
	(1.21)	(1.18)			

Note: (SOC)=Participating in student organizations or clubs on my campus is important to me; (VOL)=I believe volunteering is part of being an engaged citizen; (MEP)=I believe that me, as one person, can make a difference in my community; (USP)=I have an understanding of what is happening politically in the United States.

*significant @ p<=.05, two tailed. Standard deviations appear in parentheses below means.

A reliability analysis was run to indicate if the 12 variables (FAM, FRI, SCH, SOC, REL, VOL, MEP, AMP, USP, CUE, VOT, TIM) were a reliable index to measure the major concept: Influences on male and female undergraduate student's civic engagement. Cronbach's Alpha, a measure of reliability, was 0.760. This value indicated that the survey questions were a reliable measure of the major concept.

Discussion

The central research question in this study was, "What influences male and female undergraduate students' civic engagement?" We hypothesized, utilizing Bronfenbrenner's Ecological Theory of Development, there would be no difference between male and female civic engagement due to the similar compositions of their microsystems. Bronfenbrenner's theory suggests that there would be no difference in civic engagement of males and females because the microsystems of males and females contain the same categorical components: family, school, and neighborhood relations. The literature consulted did not address differences in gender with regard to specific influences on civic engagement. Of the literature reviewed only two studies found that females were overall more civically engaged than males (Mahatmya & Lohman, 2012; Lopes et al. 2009). One study found that females were more likely to participate in ongoing volunteering (Gallant et al. 2010).

Results of the data have provided mixed support for the hypothesis. Independent t-tests were conducted, and significant results were found for four of the 12 variables. All other variables were in support of our hypothesis and supported by literature along with Bronfenbrenner's Ecological Theory of Development. We speculate the mixed support from the data is due to unique differences in each individual's microsystem.

Although no differences between factors influencing male and female civic engagement were hypothesized, we did find four statistically significant mean differences between variables: (VOL) I believe volunteering is part of being an engaged citizen (males 4.24, females 4.82), (SOC) Participating in student organizations or clubs on my campus is important to me (males 3.98, females 4.41), (MEP) I believe that me, as one person, can make a difference in my community (males 4.34, females 4.64), and (USP) I have an understanding of what is happening politically in the United States (males 4.08, females 3.76).

The variable (VOL) evaluated the degree to which the participant believed volunteering is part of being an engaged citizen. Gallant et al. (2010) asserts that volunteering is connected to civic engagement because of the opportunities afforded to participants that share common interests and common goals. This variable did not support our hypothesis; we found that females were more likely than males to believe that volunteering is part of being an engaged citizen. This is consistent with the study conducted by Gallant et al. (2010) asserting that the likelihood of continued participation in ongoing volunteering was higher for females. Though the literature does not address this unique statistic further, we speculate that some difference in the microsystem of females compared to males has influenced females to believe more strongly that volunteering is part of engaged citizenship.

The variable (SOC) evaluated the participant's perception that participating in school clubs or organizations influenced their civic engagement. This variable was based on the assertion from the literature that participation in extra-curricular activities is linked to future civic engagement and, in some cases, higher voter turnout (Lopes et al. 2009). Females agreed more than males that participation in school clubs or organizations was important to them. Lopes et al. (2009) does not specify a difference in participation between males and females. We speculate the difference may be that females find more fulfillment in participating with their peers through school organizations or clubs, which could be due to a difference in the ecological systems of males and females.

The remaining two variables that showed statistically different mean differences, (MEP) and (USP), evaluated the participant's belief that they,

as one person, can make a difference and that they have an understanding of what is happening politically in the United States. Lopes et al. (2009) found that future participation is dependent upon whether the young person is convinced there is a benefit to their civic actions. The same study also found that students who have knowledge of the political system and laws were more likely to be civically engaged in the future. We found that males are more likely than females to believe both variables influence their civic engagement. Lopes et al. (2009) did not delve into the differences between the two genders, however. We speculate the difference between males and females may be due to traditional gender role influences. Traditionally, males have been more involved in politics. The prestige of male politicians in our society may influence other males, increasing their interest in politics. This increased interest may lead to a better general understanding with a potential for a higher likelihood being civically engaged.

Our findings of no difference between male and female undergraduate students in the remaining variables are supported by literature. The variables (FAM) My family has influenced me to be civically engaged, (SCH) My school provides resources for me to become civically engaged, and (FRI) My friends have influenced me to be civically engaged were all derived from literature that utilized the Social Capital Theory (Coleman, 1988) to investigate how individuals contribute to their larger social world (Mahatmya & Lohman, 2012). The Social Capital Theory describes how changes in social relationships create action (Coleman, 1988). Put into the context of the study by Mahatmya and Lohman (2012), Social Capital Theory describes how social relationships contribute to civic engagement. The study asserts interpersonal relationships and social interactions, such as those through family, school and friends, positively affect civic engagement. The results from our study provide further evidence for the influence social interactions have on civic engagement. We can speculate that family, friends, and school heavily influence civic engagement due to the constant interaction with the individual and the prevalence within the individual's microsystem.

The variable (REL) My religious community has influenced me to be civically engaged was derived from literature that found religiosity is significantly related to ongoing volunteering (Gallant et al. 2010). While our findings show males and females do not perceive that their religious community influences their civic engagement, our finding of no difference between males and females is concurrent with the findings of Gallant et al. (2010). Our findings differ however in that religion may not significantly influence civic engagement as only 39.6% of males and 43% of females agreed that their religious community influences them to be civically

engaged; this is a question for future research. We can speculate that because religious communities are not included in the individual's microsystem, religion has less of an influence on civic engagement.

Survey responses to variables (AMP) American politics have a relevant effect on my life, (VOT) Voting is a responsibility of U.S. citizenship, and (CUE) It is important to me to keep up with current events through news and social medias were all found to be in support of the hypothesis. (AMP), (VOT) and (CUE) addressed the interest in political responsibility of the participant. Previous studies have found that a general disinterest in politics is linked to lower levels of civic engagement (Lopes et al. 2009). However, across the three variables, both male and female students agreed that politics had a relevant effect on their lives, voting is a responsibility of U.S. citizenship, and found importance in keeping up with current events. According to literature, this may suggest that the participants had greater general interest in politics and are more likely to be civically engaged. Additionally, interest in politics is often developed through education. Because school is a part of both male and female microsystems, we may surmise that both genders' interest in politics is formed in a similar way through schooling.

Males and females alike agreed they had the time to be civically engaged (TIM). These results supported the hypothesis. Stockemer (2012) found at least 50% of undergraduate students identified that they were able to spend time on political activities. More than half the male and female participants in our study agreed they had the time to be civically engaged. Literature has found that the amount of time spent on civic engagement is influenced by both the political interest and existing level of participation. Thus, we may speculate that male and female undergraduate students who believe they have the time to be civically engaged have higher levels of civic engagement.

Limitations

The first limitation of this study was the use of non-random sampling, which did not allow us to generalize our findings to a larger population. Second, due to the location of the conducted study at a small Midwestern university, we had a less diverse population. Approximately 88% of our survey participants identified as white. Due to this skewed demographic we are unable to consider diversity or racial influences on civic engagement. A general lack of existing research on civic engagement was also a limitation of this study. With few existing research frameworks to build upon, our study had little to corroborate with in regards to gender comparisons of civic

engagement. Time was also a limitation. This study was conducted during a 16-week university course. Due to the rapid nature of the course, research had to be conducted on a strict timeframe with little room for flexibility. We were only able to consider civic engagement by comparing males and females. Though we did collect demographic data concerning socioeconomic status and age, we are unable to discuss those variables at this time.

Implications for Practitioners

This study provides insight for educators about influencers of civic engagement. When teaching or discussing civic engagement, we must remember that males and females do not always find the same topics or actions to be influential in their civic engagement and therefore we must frame the topic of civic engagement in different ways to accommodate those gender differences. This study suggests that undergraduate female students find volunteering and participating in school clubs or organizations to be influential in their civic engagement. Higher education institutions or educators could then promote volunteering and club participation to female students as a way to encourage further civic engagement. This study further suggests that undergraduate male students' civic engagement is more influenced by believing they can make a difference in the world and fostering understanding of United States politics. Higher education institutions may highlight how the student can make a difference and provide more opportunities for constructive and informative conversations about current events. We believe the most important implication for practitioners that came from this study is the need for awareness that there are different influences on civic engagement between male and female undergraduate students.

Implications for Future Research

It would greatly benefit the field of research to address civic engagement with a nation-wide random sampling of undergraduate students. Though voting is one facet of civic engagement, it is still noteworthy that young adults age 18-24 consistently have the lowest voter turnout (File, 2014) so addressing this lacking component of civic engagement is needed. It is recommended that future research consider gender differences in civic engagement since there are discrepancies across studies. Qualitative interviews may be used to discuss lived experiences and further speculate as to why gender differences exist for certain influences. Studies may also consider developing more in depth quantitative surveys to address why these gender differences in civic engagement exist. Future research may also consider using a longitudinal model of study to assess formation and development of influences on participants throughout the lifespan.

Conclusion

We hope to shed light on the significant amount of young adults whose engagement is dwindling and to question why. Our research has taken a small step by further addressing gender differences in relation to influences on civic engagement. The mixed support found through our results further reiterates the complex nature of what inspires us to become civically engaged and begs to be further investigated. Through continued research, we may learn more about the young adults of this nation so that we are better equipped to encourage participation in future generations. It is our hope that all citizens will benefit in a future that fosters the growth and development of civically engaged people.

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Politics on Campus: How Social Hierarchy and Individual Background Affect Political Behavior

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Abstract

Today's college students are our future potential political leaders, and this research aims to identify voting, political participation, and leadership trends among them. With this information we can discover the political traits that this demographic finds desirable in an elected leader, and conceptualize what our future society may look like based on social and political issues that this generation feels passionate about. A survey was sent to 2,000 randomly selected University of Wisconsin-Stout students. Multiple-choice and write-in questions were used to gather the political opinions and participation behaviors of the respondents. It was found that specific demographic characteristics are often related to a set of political ideas and opinions. Where one is placed within the social hierarchy has an effect on views of political leaders, level of political participation, and perception of potential future leadership roles.

Keywords: political leaders, participation, students

Introduction

The presidential race of 2016 was marked by severe political polarization, anti-establishment rhetoric, and passionate protests. It was one for the history books, with a very experienced female democratic candidate, a self-proclaimed democratic-socialist, a businessman without political experience, and another candidate backed by the far-right Christian community. With all the issues faced during the race—women's rights, climate change, the rise of ISIS, the LGBTQ+ movements, and shootings that have sparked gun control controversy once again—all eyes were on the contenders as they competed for the White House.

The race also cast light onto previously overlooked realities in our political system. With anti-establishment candidates at the forefront of the election, a spike in personal monetary donations, and the rise of political riots and protests, it is important to look at our political system with a critical eye. Now, in the wake of presidential turmoil, is the time to look at political

trends in a way that helps develop a greater understanding of political leadership and voter behavior.

Important questions, such as who is most likely to become a leader in our political system, who is most likely to vote and be involved politically, and how our system of politics affects specific populations, can be asked. This study was designed to better understand the political opinions and behaviors of students at University of Wisconsin-Stout. Specifically, the goal was to gather information on the students' political engagement, their ideas regarding an optimal political leader, and their perception of their own leadership qualities. The research can show how college students interact with politics, leadership, and government, and may provide insight into what government and leadership will look like in the future.

Literature: Voting and Leadership Behaviors

The dichotomy between the Democratic and Republican parties surfaced frequently throughout the literature. Sheldon and Nichols (2009) explain that the Republican Party often emphasizes extrinsic values such as wealth, popularity, and image, while the Democratic Party often relies on intrinsic values such as helping and supporting others to attract voters. Haidt (2008) outlines the differences between the parties based on five moral foundations: harm/care (compassion for others), fairness and reciprocity (how others are treated), in-group loyalty (coming together as one unit for a certain cause), authority or respect (social hierarchy or deference), and purity/sanctity (obtaining virtue through certain practices). Haidt (2008) makes the argument that an individual's support for a given political party is a direct indicator of character trait differences, guided by how the individual ranks these moral foundations in levels of importance. Those who identify as Democrat tend to place importance on caring and fairness, while those who label themselves Republican often find loyalty, authority and respect, and purity to be of importance. While Haidt (2008) adamantly reiterates that neither viewpoint is inherently wrong nor right, he does point out that those in lower ranks of society, such as women and racial and ethnic minorities, will steer away from conservative ideologies due to the traditional hierarchies that undermine their freedoms and autonomy.

Related to Haidt's (2008) theory, Winter (2010) explores how political parties have become gendered, as voters tend to associate masculinity with the Republican Party and femininity with the Democratic

Party. Winter (2010) states that their findings "suggest that even when gender is not explicitly at play, citizens' ideas about masculinity and femininity may nevertheless shape political evaluations more broadly than we might otherwise expect" (p. 588). When individuals think or hear about a political party, they may automatically apply gendered characteristics to that party's ideological framework. The gender categorizations continue. Winter (2010) claims that voters "associate masculinity with politics and leadership. The very idea of a political or public realm is constructed in contrast with the private, and the public/private duality is deeply gendered, with the public sphere traditionally associated explicitly with men" (p. 590). According to some scholars, then, both the political parties and the very essence of leadership are intertwined with gendered notions.

Gendering of political parties directly affects who gets into political leadership and what traits those leaders embody. Leadership roles have been consistently defined by masculine individuals and traits throughout the course of both United States and world history. As Winter (2010) states, ". . . the concept of leadership and the political realm itself both carry symbolically male connotations. Perhaps because of this, since the early republic presidential candidates and their campaign have often emphasized their own masculine credentials and tried to undermine those of their opponents" (p. 593). Laufer-Ukeles (2009) states that, "Male leadership is the model we have since, historically, men have been leaders" (p. 499). Since, historically, leadership roles have been consistently defined by masculine individuals, when one tries to acquire a leadership role, emphasis on masculine traits acts in their favor. Voters see those traits as synonymous with leadership, while feminine traits have been historically aligned with weakness and inefficiency. Females, therefore, have a difficult time getting into political leadership, only made slightly easier if they purposefully balance their perceived femininity with masculine traits as a way to gain favor with voters. This gendering of politics and leadership creates an imbalance in representation throughout our political system.

Many scholars discuss the topic of voting and how individuals decide which candidate to vote for. Literature on voting usually takes one of two directions: voters are irrational and ignorant in that they do not gather all necessary information to make informed decisions, or that voters make decisions based, partially or wholly, on their demographics. Caplan (2007), a proponent of the irrational voter theory, argues that "The central idea is that voters are worse than ignorant; they are, in a word, irrational- and vote accordingly" (p. 2). He then states that "the price of ideological loyalty is close to zero. So we should expect people to 'satiate' their demand for

political delusions, to believe whatever makes them feel best. After all, it's free" (p. 18). Although Caplan's ideas may seem harsh, they do hold truth in that voters do not always elect leaders who look out for society's best interest. Rather, a voter may choose a candidate that lines up with one important ideological issue, ignoring other factors that should be considered when choosing a political leader. Butler (2012) adds to this theory, explaining that voters do not want to take the time and effort to become informed on candidates, and therefore vote with an irrationally low level of information (p. 33), often just voting for or against one of the two major political parties. Individuals with minimal information often disregard how the candidate will affect society as a whole and instead focus on political affiliation or a select few ideological criteria, leading to lack of cohesion and productive elections (Butler, 2012).

Cutler (2002), however, argues that it is not totally irrational to vote with minimal information on the candidates. Cutler notes that voters can guess the expected utility of a candidate based on sociodemographic characteristics. Individuals can decide who the best candidate is for them simply based on if that candidate looks like them. The perception of shared experiences based on demographics can act as a tool for voters, especially if they do not have access to candidate information. Wallace Abduk-Khaliq, Czuchry, and Sia (2009) points out that if there is an African-American candidate, the African American population votes overwhelmingly for that candidate, especially if they are part of the Democratic Party. Cutler (2002) simply states that "Women are more likely than men to vote for female candidates" (p. 467). Thus, while some theories argue that voters are irrational and lack information, others note that voting for a candidate based on simplistic and widely available information, such as demographics, is not necessarily irrational voting behavior.

Other literature discusses political participation beyond voting. Butler (2012) makes the point that those with distinct political interests will be more involved, stating "In the struggle between interests, small groups with sharply focused interests have more influence in decision-making than much larger groups with more diffused concerns" (p. 16). The groups who have specific needs that are not being met by the government may "have a powerful, direct incentive to raise funds and campaign strongly for the project" (Butler, 2012, p. 28). The social, political, and economic needs of marginalized or underrepresented people are often ignored by a political system that is run by those who are white, male, and heteronormative, giving the marginalized reason to be heavily involved in movements that affect their daily lives. In other words, unmet needs may incite hyperactivity in the

political realm by the underrepresented, as voters, volunteers, and donor. Ditonto, Hamilton, and Redlawsk (2013) point out that women become more involved politically as female candidates make their way into elections, as a female leader may protect their rights and interests more so than a male candidate. Combining the various theories and concepts of different scholars, a series of hypotheses can be made regarding political parties, leadership, and activism.

Hypotheses

Based on the literature regarding how social hierarchy affects leadership, voting, and activism, various hypotheses are drawn for this research:

- **The gendering of ideologies between the two political parties**.
- The parties will be seen as taking on masculine or feminine characteristics
- **Underrepresented groups may be highly present in political activism, volunteering, and voting. Overrepresented groups will be less involved in political activism and volunteering**. **The overrepresented will participate in voting as it is relatively easy and usually requires minimal effort.**
- Underrepresented groups likely have needs not being met by the current government, and will have to organize together to influence politics in a way that benefits their cause. The overrepresented groups' needs and rights are already being adhered to.
- Those who are part of an underrepresented group will not be heavily involved in political leadership positions.
- Ideas of leadership have been formed around whiteness, masculinity, and heteronormativity, making it difficult for anyone who does not fit those categories to reach a place of government office.
- **If a controversial issue affects the individual directly (example: a woman being directly affected by changes in reproductive rights laws), they will be less likely to compromise. Those in an overrepresented group will be more likely to be involved in leadership roles**, **as they may be more willing to compromise.**

Methods

A survey containing 32 questions divided into four separate sections (demographics, ideal political leadership, political participation tendencies, and the individual's perceived leadership characteristics) was used for data collection. The questions were mostly multiple choice, with one ranking and

one asking for participants to check all that applied. Most questions included an optional text box so participants could write thoughts they had about the given question. While it was made clear that the survey was not mandatory, it was marketed as a way for students to explain their political opinions without judgement or fear of repercussions.

The survey was emailed to 2,000 randomly selected students; 220 completed the survey (11% response rate). Males provided a majority of responses at 56.4% (128), females at 39.2% (89), and 1.3% (3) refrained from answering. Most participants were in the age range of 18-22, making up 60.8% (138) of the responses. The participants were relatively evenly distributed across year in school, with roughly 20% of the respondents in each category. The respondents were predominately Caucasian at 89.4% (203), with 1.3% (3) African American/Black, and 3.5% (8) Pacific Islander/Asian. Native American, Hispanic/Latino, Arab/Middle Eastern, and Refrain from Answer all holding 0.4% (1) individually.

Most people categorized themselves as Democrat, 38.3% (87), or Republican, 26.9% (61), with 5.7% (13) Libertarian. Many said that they were unsure of their party, 11.5% (25), and others wrote in answers that were not listed, including Progressive, Independent, Socialist, Green, and Independent Conservative. See Table 1 for complete demographic breakdown.

		N=220	%
Sex	Male	128	56.4
	Female	89	39.2
	Refrain	3	1.3
Age	18-22	138	60.8
	23-32	44	19.4
	33-42	17	7.5
	43-52	10	4.4
	53+	8	3.5
Year	Freshman	41	18.1
	Sophomore	47	20.7
	Junior	48	21.1
	Senior	45	19.8
	Five +	39	17.2
Race	Caucasian	203	89.4
	African American/Black	3	1.3
	Pacific Islander/Asian	8	3.5
	Other/Refrain	4	1.6
Party	Democrat	87	38.3
	Republican	61	26.9
	Libertarian	13	5.7
	Unsure	25	11.5

Table 1 Complete Demographics

Data Analysis

Answers were analyzed to show relationships between demographics, behaviors, and values, while the write-in answers gave insight into general core values and prevalent ideas. Few respondents identifies as a member of a racial or ethnic minority or as a transgender or non-binary gender. Because of this lack of diversity, the categories of 'underrepresented groups' and 'overrepresented groups' were divided along the lines of sex, where females acted as the underrepresented group and males acted as the overrepresented groups. This division can give general insight into how social hierarchies affect political involvement.

Quantitative Data Analysis

Gendered Politics

The gendering of political parties was analyzed using binary logistic regression. Females were more than twice as likely as males to label themselves as Democrats (sig. 0.004). Participants were also asked to rank a set of eleven political leader traits in order from most to least important according to their own opinion. The traits list consisted of three feminine/Democratic traits (*caring, values fairness and equality, respects diversity*), three neutral traits (*honest, highly educated with at least a bachelor's degree, ethical*), and five masculine/Republican traits (*tough on crime, authoritative, has proud religious affiliation, loyal to group, a*nd *embraces tradition*). While the traits are not inherently masculine or feminine, many of the traits were chosen due to their historical gendered connotations that were discussed earlier in the paper. Analyzing how groups organized the traits was carried out through ordinal regression. Democrats were less likely to place the *authoritative trait* (sig. 0.00), *loyal trait* (sig. 0.033), and *religious trait* (sig. 0.001) in their top five leadership traits, when compared to Republicans. Democrats were over ten times more likely to place the *values fairness/equality trait* in their top five (sig. 0.0005), and twice as likely to put the *caring trait* in the top five (sig. 0.037). These tendencies of trait ranking between the political parties insinuate a gendered ideology of the parties. The average rankings of leadership traits according to sex and political party can be seen in tables (2) and (3).

	Female	**Male**
1	Honesty	Honesty
2	Ethical	Ethical
3	Values Fairness/Equality	Caring
4	Respects Diversity	Values Fairness/Equality
5	Highly Educated	Highly Educated
6	Caring	Tough on Crime
7	Tough on Crime	Respects Diversity
8	Authoritative	Authoritative
9	Loyal to Group	Loyal to Group
10	Embraces Tradition	Embraces Tradition
11	Religious Affiliation	Religious Affiliation

Table 2 Important Leadership Traits in Order: Sex

	Democrat	**Republican**
1	Honesty	Honesty
2	Ethical	Ethical
3	Values Fairness/Equality	Authoritative
4	Respects Diversity	Tough on Crime
5	Highly Educated	Highly Educated
6	Caring	Values Fairness/Equality
7	Tough on Crime	Caring
8	Loyal to Group	Loyal to Group
9	Authoritative	Respects Diversity
10	Embraces Tradition	Religious Affiliation
11	Religious Affiliation	Embraces Tradition

Table 3 Important Leadership Traits in Order: Party

Social/Political Issue	Overall Frequency (n=220)	Female(n=89) /Male(n=128)		Democrat(n=87) /Republican(n=61)	
		F	M	D	R
Economic Growth	61.4% (135)	45%	71.8%	51%	77%
Protecting the Environment	53.6 (118)	57	49	69	26
Substance Legalization	24.5 (54)	19	28	31	15
Foreign Policy	45 (99)	31.5	55.5	39	57
Funding Education	61.4 (135)	66	57	75	46
Illegal Immigrant Removal	20 (44)	10	26.5	7	42.5
Gay/Non-Binary Rights	38.1 (84)	51.6	27	58.5	10
Fighting Racism	44.5 (98)	59.5	33.5	68	15
Gender Equality/Women's Rights	47.7 (105)	64	34	69	25
Protecting Reproductive Rights	35 (77)	48	25	52	13
Protecting Gun Rights	40 (88)	28	48	16	72
Limiting Government Power	36.8 (81)	23.5	45	23	64
Environmental Justice	40 (88)	49	32	55	13

Table 4 Important Social and Political Issues

Involvement and Activism

The question attachment to social and political issues was analyzed to understand the motivations behind activism and leadership. Binary logistic regressions indicate females were over two and half times more likely than males to see human rights issues in a broad sense, including gender equality, reproductive rights, fighting racism, and LGBTQ+ rights, as important (sig 0.001). Females were three and a half times more likely to see gender equality as important (sig 0.0005), and almost three times more likely to see reproductive rights as important (sig. 0.0005). They were also about half as likely to view non-human rights issues, including gun rights, foreign policy, and limiting the government, as important (sig 0.002). Finally, females were over twice as likely as males to view environmental justice as an important issue (sig. 0.008). Table (4) lists the complete analysis of social and political issues by sex and political party.

Regarding political participation, respondents were asked if they ever volunteered for or donated to a political campaign. Only 17.2% said that they had donated, and only 9.7% said that they had volunteered. Because of small reported participation in these activities, no statistically significant information regarding gender, race, and participation can be gained. In regards to voting, however, females were less likely than males to vote in federal and state elections (sig. 0.034). They may have also been less likely to vote in local elections, but the relationship was statistically insignificant (0.558). This finding provides some confirmation of the hypothesis that the overrepresented group will be involved in voting as it is easy and accessible to them.

Involvement in social and political issues may also be seen through the route of activism; participants were asked if they would label themselves as an activist. There was no significant relationship between gender and labeling oneself as an activist, meaning the hypothesis positively relating underrepresented groups to activist tendencies was not supported. The binary logistic regression results further showed that issues people found important were mostly unrelated to activism. The only significant relationship was between seeing LGBTQ+ rights as important and activism. People who valued LGBTQ+ rights were over five times more likely to label themselves as an activist than those who did not mark that issue as important (sig. 0.051). This may provide some support for the hypothesis in that those in the LGBTQ+ community or those with friends in that underrepresented community are more likely to be in positions of activism in an effort to meet the underrepresented peoples' needs. Finally, the respondents who were in an on-campus organization or club were almost 24 times more likely to label themselves as an activist than those not in clubs or organizations.

Leadership

Logistic regression indicated no relationship between political party affiliation and an individual believing that they would be a good political leader. Women were roughly half as likely as men to view themselves as good political leaders (sig. 0.027), partially confirming the hypothesis that those in underrepresented groups will not be in leadership positions or feel they cannot take up leadership positions. Those who labelled themselves as an activist were more likely to see themselves as a good political leader than those not labeling themselves as activists (sig. 0.004). Respondents in an on-campus organization or club were more likely to view themselves as a good political leader than those not involved (sig. 0.007). This may indicate either that those with leadership personalities are attracted to group organizations, or that being part of a group effort promotes feelings of leadership.

Covariate	Exp(B)	Significance (P-Value)
Democrat/Republican	0.906	0.807
Female/Male	0.45	0.027*
Activist/non-Activist	4.73	0.004**
Organization and Club/No Involvement	2.50	0.007*
Limiting Government Important/Not Important	2.178	0.072
Reproductive Right Important/Not Important	0.384	0.039*
LGBTQ+ Rights Important/Not Important	2.70	0.078
Non-Human Rights Important/Not Important	1.865	0.108
Human Rights Important/Not Important	0.905	0.771

Table 5 Binary logistic regressions of what affects feelings of being a good political leader

* significant at $p<0.05$; ** significant at $p<0.005$

Test group first, reference group second, n=220

Compromise

The final hypothesis is that the ability to compromise would enable one to work their way into leadership, as they could make adjustments to their political agenda in order to appeal to the largest amount of voters. Respondents were asked if they would compromise on an issue very important to them if it meant getting elected. The relationship between accepting compromise and sex was miniscule and not statistically significant (0.648). There were also no significant relationships between social and political issues people found important and their willingness to compromise. Although Democrats were more likely than Republicans to compromise on certain issues, the relationship was not significant (0.627). Overall, 64.7% of females and 61.2% of males said that they would not be willing to compromise. These findings do not support the hypothesis that those in underrepresented groups would be less willing to compromise based on their closeness to controversial issues.

Qualitative Data Analysis

Of the 220 individuals who took the survey, 84 % used the write-in option at least once. The average number of times those individuals opted to respond to a write-in option was 7.5 times out of 15 opportunities. While there were a wide variety of responses and opinions relayed, definite themes emerged from the participants' thoughts and beliefs.

In regards to the question on ideal political leadership traits, openness and transparency (54), ethical (14), integrity (11), and values equality (10) were the most prominent written-in responses. Least desirable traits of a political leader included dishonesty (27), highly religious (25), corruption and greed (18), and judgmental and closemindedness (11). When discussing voting and volunteering for a campaign, many individuals said that they did not participate because it would make no difference due to the money and power in elections (32). Many also said that voting is necessary to make one's opinion heard (19). Similarly, when discussing if one's voice will be heard through calling and sending letters to government officials, many said that the officials do not care unless there is money attached (22) or because there are too many letters and calls for one to matter (39). Some respondents pointed out that direct contact is the most important resource in telling

officials what a community needs (18).

The respondents were asked if they felt they had the qualities to make a good political leader. Many who they did have political leadership qualities cited previous leadership experience (11), ability to listen and communicate (7), and honesty (9). Those indicating a lack of leadership traits mentioned that they simply did not like politics and did not want government authority (22). When asked what political or social issue they would focus on if they ever ran for office, respondents noted education (22), equal and reproductive rights (20), economic growth (16), sustainability and environmental issues (25), and gun rights (12). As far as compromising on those issues, many respondents thought that it was pointless or wrong (51) to compromise on important issues. However, others noted that there was a time and place for compromise (31).

While not fitting neatly within the bounds of the hypothesis, the write-in responses provide information that offers a glimpse into the thought-processes and feelings of some students. While the quantitative data indicate that some groups feel more strongly about leadership, political issues, and activism than others, the write-ins provided an overall feeling that many people are disappointed by the current government and political systems. Regardless of belonging to an overrepresented or underrepresented group, many students point out that they are misunderstood and not heard by government leaders and the 'other' political party.

Limitations

While the response rate was acceptable at 11%, some groups (racial/ethnic minorities and transgender and non-binary gender individuals) were too small to gather any information from. The underrepresented and overrepresented groups, therefore, were confined to female and male.

It must be pointed out that some of the questions were self-reportative. The participants were asked if *they thought* they would be a good political leader, and if they would *label themselves* as an activist. The self-reported data shows how the respondents see themselves after reflecting on the political systems and political leadership surrounding them. Understanding how people think of themselves can explain how certain groups of people become leaders, activists, or any other number of roles in a self-fulfilling prophetic fashion.

It may also be noted that this study is not representative of a generalized population. The study took place in the Midwest at a small state university, with a majority white campus population. The study is representative of this specific population, but results cannot be applied to a larger general population.

Discussion and Conclusion

The theory of gendered political parties seemed to be represented in this research. Democrats did put the traits of a leader that have feminine connotations—fairness and equality and caring—on the top of their list significantly more often than Republicans. And Republicans put the traits with masculine connotations—authoritative, loyal, and religious affiliation—in their top five more often than Democrats. However, it is unclear as to whether people listed the traits in this fashion because people of those political parties generally find those traits to be more important and the party is essentially built off of those traits, or if the parties are just assumed to be associated with those gendered traits. Women were significantly more likely to be a part of the Democratic Party, as Haidt (2008) notes to be the tendency. It is possible that the high concentration of women in the Democratic Party perpetuates the gendered views of the parties.

This study revealed that leadership is marked by masculinity. Females were half as likely as males to view themselves as a good political leader. While females found issues such as reproductive rights and gender equality to be important, issues that often incite feelings of frustration or need for change, they were still less likely than males to see themselves as making a good political leader. According to Laufer-Ukeles (2009), females are still being deterred from leadership positions because of the historical synonymy that has been created between maleness and leadership. Thus, women should be empowered to use their knowledge and experiences in the form of leadership, rather than being forced into the preexisting notion of masculine leadership (Laufer-Ukeles 2009). To achieve equality in leadership and to be representative of the actual population, we need to overcome the limitations of male leadership and the ideas that only masculine characteristics are suited for leadership.

The issues that individuals found to be important did not have a significant effect on feelings of being a good political leader, further solidifying the dichotomy of sex in leadership. Social and political issues did not motivate leadership. Feelings of being an activist did relate to feelings that one is a good political leader. Those who labelled themselves as an activist were over four and a half times more likely to see themselves as a good political leader. Those who were in on-campus clubs or organizations were almost 24 times more likely to label themselves as an activist than those not involved. Thus, there may be a relationship between feelings of leadership, the activist label, and being involved on-campus. The direction of the relationship is uncertain, however. It is unclear whether those who are in organizations view themselves as activists and therefore see themselves

as becoming good leaders, or if those who see themselves as good leaders are the ones to get involved in on-campus organizations and clubs through activist ideals. Despite the uncertainty in that triangular relationship, it is clear that sex has no significant relationship in feelings of activism or levels of on-campus involvement, but it consistently plays a role in feelings of being a good political leader.

There was no support for the theory that those in an underrepresented group would be more involved in political participation and activism than the overrepresented. The underrepresented group was less likely to vote, and there was no significant relationship between labelling oneself an activist, being in an on-campus organization or club, and sex. It should be noted that results may have differed if there were greater levels of racial, ethnic, and gender diversity. While the study shows the political behaviors of overrepresented and underrepresented groups in regards to female and male, it cannot predict the behaviors of other groups.

Finally, there were possible relationships within this research that could not be verified through statistical analysis. Many political participation relationships that are commonplace in major research, such as passion towards a social issue leading an individual to an activist lifestyle, were not significant in this research. Niemi and Hanmer (2010) offer an explanation for these lack of answers, noting that college is a transitional phase in which students often do not fit into commonly analyzed categories used in voter turnout models. Huddy (2001) further notes that student's social identities are fluid. The huge transitions that college students go through may partially explain the lack of significant relationships found in this research.

However, two things resonated very clearly throughout the responses. First, the individuals who took the survey really cared about discussing politics and government. Although it is possible that those who care about politics took the survey and those who did not care opted out, there were still more responses, more write-ins, and more passion than could have been expected. Second, respondents were upset. They consistently cited animosity toward a corrupt government, politicians that are owned by big businesses, the party divide, and feeling like the leaders do not listen to their constituents The write-in responses reflected that individuals felt their voices were not being heard over the chaos of the 'other side' and that big money was the most important concern for most politicians. This might also explain the lack of political participation and activism found among participants.

The presidential election of 2016 has raised some serious questions regarding leadership, activism, and voter trends. The turmoil that surrounds the campaigns and elections of 2016 force us to look deeper into what social

and political issues are deemed important, how people decipher the best political leader for themselves, and how individuals become activists and leaders in our current political landscape. As potential future leaders and social actors, college students can and should be studied to better understand the trajectory of government and politics. Future research should delve deeper into how the election of 2016 has affected young peoples' perceptions of politics, how young individuals are purposefully becoming activists and leaders, and what students hope to see in the future of politics and government.

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Product and Facility Design for Hydroelectric Generators in Malawi

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Abstract

Currently, over 50% of the population of Malawi, Africa lives in poverty and many have little or no access to reliable power systems (Malawi, 2015). Due to this, a group from the University of Wisconsin-Stout travelled to Malawi to conduct research on how a developing country may manufacture electric generators.

The main question that needed to be answered was: how does one build an electric generator in a developing third world country? This overarching question can be broken up into 3 main parts:

- What tradeoffs, if any, need to be made when designing hydroelectric generators in Malawi?
- Is it possible to utilize available scrap to manufacture a consistent product? How can consistency be guaranteed?
- What changes need to be in place for a "safe" work environment to be created?

Methods utilized in answering these questions included visiting sites of manufacture and generator placement, observing current safety protocol, measuring current generator output, taking inventory of scrap material, and searching for what material sources are available.

The results of this research produced two new generator designs tailored to the region's manufacturing capabilities. It is believed that creating micro-hydro generators in this region of Malawi will be possible if certain metal casting processes and safety procedures are put in place.

Keywords: Malawi, generator, prototype, electricity, power

Introduction

In Malawi, about 10% of the population has access to reliable electricity (Access, 2016). Most homes in this region utilize kerosene generators that are not only expensive, but are dangerous due to the gasses generated. This causes many younger people to suffer from respiratory issues,

1 Joshua received support for this project through UW-Stout's Office of Research and Sponsored Programs (Ed.).

including coughing. Many homes and villages are in rugged and remote locations, far from the power grid. To solve this, Hastings Mkandawire, a Mandela Young African Leaders fellow, created hydroelectric generators from recycled materials. The generators are placed in small streams near individual villages. In 2014, Mkandawire visited the University of Wisconsin-Stout. Once there, he was awarded the Mandela Young African Leaders Fellowship, as well as a $25,000 US-Aid grant to build a facility to produce his generators. At this ceremony, he was singled out by President Obama for his innovation.

There were problems in the initial design. Recycled components were becoming scarce, generator efficiency was low due to part variation, and the generators did not produce enough power for large appliances to function. To address these issues, a new design was created by UW-Stout students in 2014 which was further refined in the spring of 2015. The facility layout was also defined during the spring refinement. This design took into account that Malawi is a developing country.

This new design utilized scrap metal only for the frame, and incorporated plastic resin components that eliminated the need for purchased steel, expensive equipment, and skilled operators. Purchased parts were limited to copper wire, magnets, epoxy resin, and bearings. With the resulting improvements, estimated production time dropped from 40 hours to 3 hours. 'Lean methodologies' were applied in the facility design so that the production would run smoothly. The core idea of 'lean manufacturing' is to maximize customer value while minimizing waste. In this context, having a lean manufacturing process allows for creating higher-quality generators with fewer resources (What is Lean, 2016).

However, the estimations and designs done solely in the United States did not adequately solve the problems Hastings was having. To better understand the issues citizens of Malawi face in manufacturing, a trip to Malawi took place on January 1st, 2016. This paper details the questions that were asked as well as the observed findings.

Objectives

The objective of this trip was to determine the viability of manufacturing micro-hydroelectric generators in Malawi. Micro-hydro generator systems are small hydroelectric power systems of less than 100 kilowatts (kW) used to produce mechanical energy or electricity for farms, ranches, homes, and villages (Microhydropower, 2013). To support this objective, the following eight questions were initially proposed (any modifications to the initial questions and reasons for exclusion are included in the list).

1. Generally: how does American product design need to be modified to work in a developing country?
2. Generally: what tradeoffs, if any, need to be made in designing a safe and efficient facility in a developing country?
3. Is it possible to manage variable scrap material dimensions and quality and yet maintain a consistent product?
4. How does limited material availability affect product design for a developing country?
5. Can a developing country support the production of simple hydroelectric generators?
6. What quality inspection processes can be implemented in a developing country?

   It was decided that epoxy would not be used
   For the finished generators.
7. Much of the time was spent designing a new generator based off of newfound constraints and information. Also, there was no set process or design to base a troubleshooting procedure on
8. What industrial safety equipment and policies can be implemented in a developing country?

As mentioned above, this list of questions was modified from the original due to unforeseen project changes. These changes caused some of the questions to become impossible to answer, and caused others to become redundant. To make this paper more concise, the questions were rewritten as follows:

- What tradeoffs, if any, need to be made when designing hydroelectric generators in Malawi?
- Is it possible to utilize available scrap to manufacture a consistent product? How can consistency be guaranteed?
- What changes need to be in place for a "safe" work environment to be created?

Methods Utilized

Methods utilized in answering these questions included visiting sites of manufacturing and generator placement, observing current safety protocol, measuring current generator output, taking inventory of scrap material through observation, and searching for what material sources are available.

To support the studies that are listed below, a prototype of a "new" design was created. Discussion on this prototype occurs in its own section, "The Prototype."

- To obtain an answer for how viable working with scrap materials was, measurements of all created parts were made using a dial caliper accurate to .001″.
- To obtain time studies, a stopwatch was utilized and the steps to create each part of the prototype generator were recorded.
- The generator's voltage output was measured with a Metex Multimeter.

Results

What Tradeoffs, if Any, Need to be Made When Designing Hydroelectric Generators in Malawi?

After spending time in Malawi, it was found that a few non-typical factors must be considered when designing products for manufacture in developing countries. The factors are as follows:

- Machines such as lathes and mills are in short supply. Many operations must thus be done by hand. If a product design requires the use of multiple machines, it will not be successful.
- Large scale casting is difficult, if not impossible. There is a tradeoff between repeatability and size that must be considered. For example, generator bodies are cast as one part in most industrialized countries. That one part is too large for the miniscule casting industry that is present in Malawi, therefore the body has to be cast as multiple pieces to be assembled later.
- Manpower is a very plentiful resource that is considerably cheaper in developing countries. This allows for designs that require more handwork and assembly to be much more viable in developing countries than in developed countries.

Also, designs have to account for the fact that assemblies that require many different parts are almost impossible to make due to limited hardware components. Using similar components across an entire design (such as using the same size screw across assemblies) is generally good design practice, but is especially important in developing countries.

Is it Possible to Utilize Available Scrap to Manufacture a Consistent Product? How can Consistency be Guaranteed?

The inconsistencies in the generators made from scrap materials caused the total voltage output to vary widely, a fact found through a discussion with Hastings. However, scrap pieces could easily be used in the generator frames without impacting electrical output. Scrap could also be melted down to create new parts.

Calipers appeared to be an available resource, thus lending to the

assumption that simple dimensional quality checks could be put in place to guarantee quality. It would also be possible to create go/no-go gauges for many of the parts. Anything that is more advanced (e.g. automated testing equipment) is out of the question due to cost and lack of training.

Electrical measuring tools (such as Multimeters), though rare, are still a viable option for quality checks and troubleshooting steps. Having this tool will allow the process to be refined further through the analysis of why some generators may have defects (such as low output) while others pass inspection.

High levels of accuracy and precision were obtained in the creation of the manufactured components due to the skill level of the technicians. The technicians cut 12 stator supports within 1mm precision on length and also built a circular stator within 1mm precision on concentricity. It can be concluded that for consistency to be "guaranteed," certification through a technical school is a must.

What Changes Need to be in Place For a "Safe" Work Environment to be Created?

No tradeoffs need to occur to create a safe work environment. However, implementing safe practices at a facility can be heavily burdened by the current lack of training. It is very important to ensure that the individuals know what procedures are required and why these procedures are used. For example, even though the current facility had a welding helmet, it was rarely used. In fact, workers tended to look directly at the arc. In general, safe practices by Western standards are not part of the local culture, and must be taught and reinforced at the workplace. The worker with the technical school education was more likely to use the available safety equipment. Hastings Mkandawire was exposed to safety equipment when at Stout, and understands why it is needed, but must overcome his cultural practices to remember to use and encourage his workers to consistently use the safety equipment.

Discussion/Implications

It is important to note that a casting industry needs to be in place to fully support medium to mass production of generators. Medium to mass production, in this context, was deemed to mean, "producing more than 20 reliable generators a week." With metal casting, the process required to produce a generator is simplified as metal would not have to be cut and welded into shape. Because of the simplified process, the time to produce generators is reduced, allowing for more generators to be produced in a

shorter time span. Quality can also be improved as there are fewer steps in the build process that could result in defects.

The other benefit of using a casting process is that specifically shaped scrap metal parts are not necessary as metal could simply be melted and cast into the correct shapes. This eliminates the time spent searching for parts in junk yards. Also, quality scrap metal parts in northern Malawi were becoming scarce as of January 2016, which made producing consistent generators difficult (Mkandawire, 2016).

The Facility

The final facility was not ready by the time of arrival, so the Stout group worked with the team at a temporary location, which was a subleased room of an auto-repair shop.

Safety Standards

The expectations for safety standards in Malawi were low after watching presentations on safety in other countries. It was a pleasant surprise when safety equipment was seen upon arrival at the facility. However, even though the group possessed a darkened welding helmet, gloves, long pants, jackets, and safety glasses, they were still rarely used.

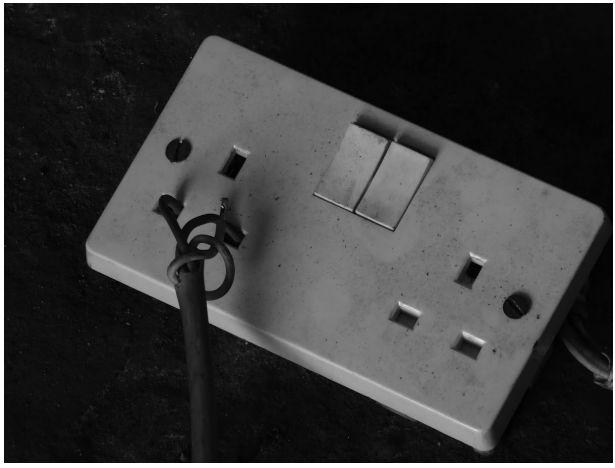
Focusing on the welding violations, and using a resource from the American Welding Society, many violations were noted (Safety, 2005). Violations include:

- 3.2.1.3 Designated Areas and Responsibilities – welding was done wherever it was convenient.
- 4.1.2 Signs – no signs were posted designating the fact that

welding would be done in the area.

- 4.2 Eye and Face Protection – welding operations were mainly carried out by holding the gun and closing one's eyes. Welding was often done out in the open, with onlookers staring directly at the work being done.
- 4.3 Protective clothing – gloves were only used if a piece of metal was to be moved immediately after the weld was finished. Tennis shoes and sandals were worn, as were short sleeved shirts.

The outside location ensures natural ventilation (Section 5) and there was no fear of confined spaces when working outside (Section 7). This will need to be reevaluated once the move to an indoor facility is complete.



Electrical safety was poor as can be seen in the image above.

United States Electrical Safety standards are standards created through years of labor, experience, and training. A study done by Kimberly-Clark Professional at the 2008 National Safety Council Congress may be applicable to this situation. In the study, 89% of the respondents reported witnessing safety violations in the work place. Of those, 63% stated training and education for safety was lacking (Why Do Workers, 2016). While many of the workers had some degree of technical training, it seemed apparent that the effects of not wearing personal protective equipment were not disclosed. If images of eye damage from welding were shown, wearing the mask might become more standard. Interestingly, safety equipment was used wherever danger was immediately apparent, such as wearing gloves with spinning cutting discs and extremely hot metals.

Besides lack of safety training, the environment and the economic situation of the region also had a hand in the lack of equipment use. For one thing, Malawi is in a tropical zone so it is often very hot, so hot that there are times when it is dangerous to be working outside. This makes it hard to wear longer shirts and pants. The scarcity of funds would also make it harder to buy safety equipment for all personnel.

Pictured above is one of the best examples of safety seen at the facility. He is wearing full protective clothing and safety goggles. However, personal protective equipment was not available to everyone.

Training/Education

Some of the workers had formal training with machines commonly found in manufacturing (such as lathes, mills, and arc welders). However, many did not or had just learned by watching. Most likely, this resulted in some of the safety violations witnessed in the Safety Standards section.

A discussion with one employee regarding his schooling resulted in some interesting comments, which are paraphrased below:

- The schools teach maintenance, not design.
- How does one learn how to create new designs?
- How do you go about designing something new?

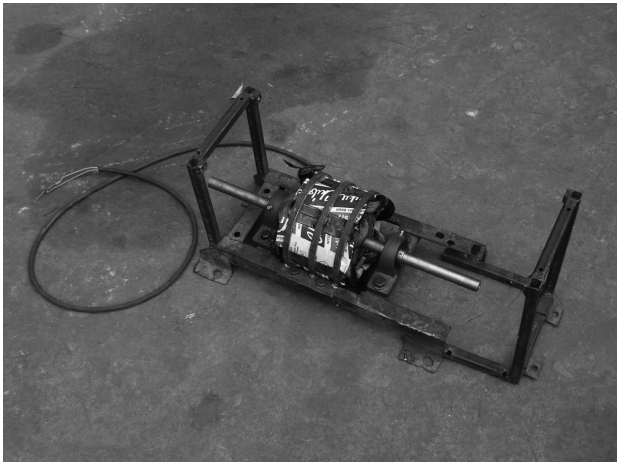
These questions were asked after the prototype was designed as the employee thought he did not have the skillset to design *anything* because he was not creative. This thought was immediately corrected. The mindset was that he was not creative was most likely stimulated by economics. Since the citizens in the area could not afford new items, it was very important to have workers that were great at maintenance. Oftentimes, this maintenance required a great deal of creativity. After hearing the explanation on how maintenance requires creativity, the employee began to realize that he was fairly creative and different ideas were discussed for improvement projects that he came up with almost on a daily basis.

Why Build Locally?

Building locally is important for a few reasons:

- It could spur local manufacturing
- It is much more economical, as labor and most raw materials are plentiful and cheap
- Local building could jump start learning opportunities. Increased education in a country has many large benefits (including financial stability)
- Money would stay almost entirely within the country, increasing opportunities through an improved economy

The Prototype



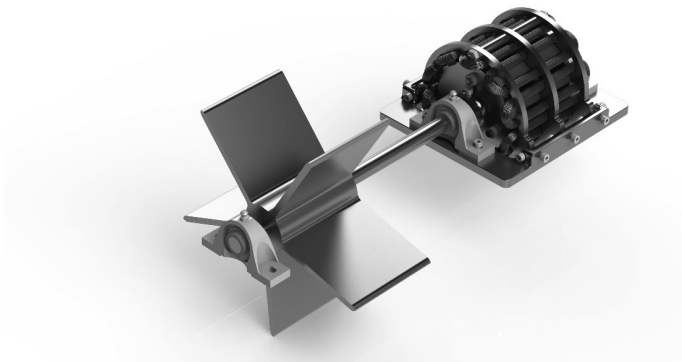
Up until this point, the team in Malawi had been repurposing old generators and motors. After understanding the capabilities of the personnel and equipment, a new design was created for the purpose of testing whether or not it was feasible to create a generator from pure scrap. One of the constraints placed upon the design was to use a minimal amount of material (this design is further discussed in the Cage Style section below). The team began creating the new prototype once a few rough sketches were completed. The picture above is the final result. While the output of this prototype was inconsistent, it was deemed that creating a generator from pure scrap is possible.

The New Designs

If the reader is interested, he or she may navigate to **generatormodels.joshuamiller.io**. All of the solid models created for these designs are there for public use. If the models are used, please give credit to the initial creator(s).

- Two items are the same across both designs.
- The parts are cast from metal.
- Magnets, or electro-magnets, of sufficient magnetic strength are used. "Sufficient magnetic strength" can be calculated using the final voltage output of the generator, the average rotations per minute the rotor will spin, the number of magnets used, and radius of the magnets around the shaft.

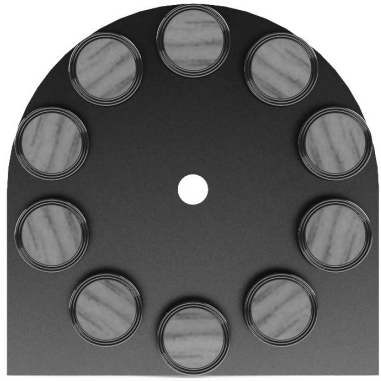
Cage Style



This style borrows the base design from the popular generator designs of today, and modifies it so that it is more feasible for a third world country to develop. Material is saved by slicing the body of the generator into multiple parts and using spacers to achieve the desired size. This is also easier to manufacture because the molds used to cast the parts can be smaller. The

main tradeoffs with this design are that the internal pieces are now lacking protection and there are more components to make and assemble.

Disc Style



A previous group of students tried creating a disc style generator, but it had been deemed a failure. This was caused by two issues. One was that the discs were comprised solely of epoxy, which is expensive. Another was that the magnets used were too weak, which caused the voltage that was produced to be very low.

The design would have sufficed if stronger magnets were used. If one merely searches the internet for "1000 Watt turbine" he or she will find examples of disc generators that were built at home (sspence, 2016).

This design makes up for its bulky nature by having very few parts and is generally simple to produce. Instead of having multiple rings that fit together to create a rotor and stator, it only has two plates. Because of the simple nature of the design, the molds used to create the disc shape would also be much less complex. The process used to ensure quality would also be less extensive than with the cage style.

The main difficulty with this design is creating the rotating electrical connection required to maintain power to the electromagnets.

Limitations of the Study

Even the most thought out and planned projects have unforeseen issues. In the weeks leading up to the departure, the group received new details via email about the current state of the manufacturing facility as well as new details about the work Hastings wanted the group to do. It was found that there was no consistent production process in place. It was also found

that the facility was still being finished. However, enough objectives were completed that this project can still be evaluated with some accuracy.

Future Work

More work has to be done before this project becomes a reality. This includes, in order:

1. Studying the benefits of AC vs DC generators
2. Creating the electrical component part list if AC to DC conversion is needed
3. Setting up an aluminum casting process in Malawi
4. Finalization of the generator design by an engineer with more experience in the field
5. Finding suppliers of wire and scrap metals so that components could be created
6. Creating molds so that the components could be cast
7. Finalizing a quality inspection plan

Conclusion/Evaluation

In the original proposal, the project was to be evaluated on three criteria:

1. The voltage output of the generator.
2. The cost to build and maintain the final product/process.
3. The repeatability of the proposed manufacturing process.

Voltage Output

The completed prototype generated 44 volts. When one looks at the prototype that was created, and the way that it was manufactured, an output of 44 volts is acceptable. It is anticipated that once proper manufacturing processes are in place, this number will be much higher. More testing will be needed.

Cost of Production and Maintenance

The cost of the final process will come mainly from material purchase, since labor is exceedingly cheap in Malawi. In 2009, the average annual wage was $286 USD in urban settings (Durevall & Mussa, 2010). The prototype generator took 2 workers about 3 days to build. The cage generator design should take the two workers only one day to build, and the disc style generator should only take 6 hours to build. Although the labor cost savings are low, this permits a significant increase in output.

The costs of importing aluminum and setting up an aluminum

foundry, as well as the costs of importing wire and magnets, are still being analyzed. One possible method that would reduce costs would be to utilize scrap aluminum. Use of the electromagnet design significantly reduces costs, as the magnets are by far the most expensive components of the generator. Other sources of financial aid are now being researched by Hastings.

Repeatability

The designs that were conceived after the trip simplify the necessary components to the point where quality (when defined as the ability to produce consistent voltages) can easily be obtained by switching from hand cutting and welding to casting critical parts. The only issue is that for either of the designs to work, a casting facility must be introduced in northern Malawi. Through contacts that were made over the course of the trip, it was found that metal casting as a process will almost certainly come to the region as it exists successfully in the southern part of the country. It benefits many different industries and thus has many different vested interests.

Final Evaluation

This project and trip is considered a success for multiple reasons. One is due to the fact that multiple new class projects were brought back to the University of Wisconsin – Stout. As a polytechnic university, this is highly beneficial. Also, because of this trip new designs were created so that generators could be manufactured in Malawi. These designs would have been much more difficult to conceive if limitations of existing materials and the issues faced by manufacturing processes were not witnessed firsthand. Lastly, because of these new designs an industry new to the region (metal casting) may finally come into existence. This could kick start a small industrial revolution in a struggling country and give many rural homes access to reliable electricity.

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Transient Kinetics Studies of Azo Dye Oxidation Catalyzed by Horseradish Peroxidase

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Abstract

The release of azo dyes into the environment is a continuing hazard resulting from industrial wastewater being released into the ecosystem. The industrial wastewater contains azo dye runoff that is used to color textiles, food, cosmetics, and other industrial products[1-3]. Oxidative decolorization is a potential method to remediate azo dye contamination[1-3]. Horseradish peroxidase (HRP) is an enzyme with a wide substrate range for organic compounds and strong oxidative power, making it a potential catalyst for azo dye decolorization. The oxidative strength of HRP is due to the Fe(III)-heme prosthetic group that reacts directly with hydrogen peroxide (H_2O_2) to form the high valent Fe-oxo species known as compound I (cpdI) and a subsequent intermediate, compound II (cpdII)[4-8]. These enzyme-bound high valent Fe-oxo species extract single electrons from a range of organic compounds via a collisional reaction, generating free radical species in solution. The radical species undergo radical quenching via different chemical routes, resulting in a wide range of products from a single organic substrate[4-8]. Previous research has shown that HRP catalyzes the oxidation of several azo dyes. The research described here focuses on the oxidation of the azo dye Orange IV (OIV). Initial research showed that OIV is oxidized to form a product, denoted as P-1, via a multistep process; however, further work showed that the reaction continued at a slower rate. The research described here utilized transient kinetic techniques to examine the slower reaction to elucidate a more complete mechanism for the oxidation of OIV and aid in future environmental remediation techniques.

Keywords: azo dye, horseradish peroxidase, oxidationIntroduction

Environmental Implications

Azo dyes are used as colorants in industrial manufacturing in products such as paper, food, cosmetics, textiles, leather, and medical treatment/analysis[1-3]. But, colorant losses up to 10-15% can occur in wastewater during certain stages of manufacturing[2-3]. These dyes in the wastewater are

a serious concern because of their toxicity and stability in the ecosystem. The dyes reduce light penetration resulting in damaged photosynthetic activity, oxygen deficiencies, and high mutagenicity[1-2]. Effective and efficient methods from removing or degrading azo dyes from industrial waste streams are needed to mitigate the negative impact of these dyes in the environment.

Many methods for azo dye decolorization and removal are in use and are currently being studied. These techniques include biological treatment, coagulation, electrochemical techniques, adsorption, flocculation, flotation, ozonation, membrane separation, reduction, and oxidation[1-2]. The most common treatment used today is adsorption using activated carbon[1-2]. Although activated carbon works efficiently, it is very expensive and has issues with regeneration[1-2]. These high costs have caused scientists to consider naturally occurring adsorbents and other low cost materials[1-2]. Enzyme oxidation, catalyzed by the enzyme HRP, is the biological treatment method studied in this research.

Horseradish Peroxidase

HRP is a heme-based enzyme derived from the horseradish root[4,7]. HRP belongs to the peroxidase family of enzymes which utilizes hydrogen peroxide to oxidize a wide range of chemical components such as phenols, aromatic amines, thioanisoles, and iodide[4]. HRP is made up of 308 amino acid residues with a heme pocket[4]. The N-terminal residue appears to be blocked by a pyrrolidenecarboxyl residue buried in the peptide chain[4]. At the C-terminus, peptide sequences appear with and without a serine residue which indicates an unstable asparagine-serine peptide bond[4]. In this enzyme, ferric iron has a 6-coordinated geometry with an open binding site for H_2O_2. Positions 1-4 in HRP are bonded to four pyrrole nitrogen atoms and position 5 contains an imidazole side chain of a histidine residue on the proximal side (Figure 1)[4]. The 6th position, located on the distal side, remains open and is used to bind the hydrogen peroxide. The distal heme pocket is created from arginine 38, phenylalanine 41, and histidine 42[4,6]. These residues facilitate cleavage of the O-O bonds[4,6] of H2O2 via general acid/base chemistry, resulting in the formation of a highly oxidized intermediate form of the heme group in the enzyme. This formation initiates the catalytic cycle of HRP.

Figure 1.

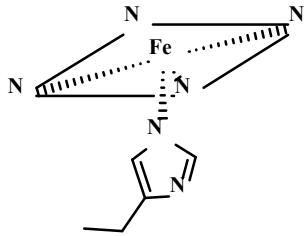

Figure 1. Native HRP heme group with distal histidine sidechain depicted.

Catalytic Cycle

HRP's catalytic cycle is a three step mechanism consisting of the native HRP (Fe (III)), compound I and compound II (Figure 2)[4]. The first step in the catalytic cycle is the formation of compound I by the cleavage of H_2O_2 and the release of water. This reaction increases the oxidation state of the enzyme by two equivalents. Compound I contains an iron-oxo group (Fe+4=O) and a porphyrin -cation radical[4]. This highly oxidized species oxidizes organic substrates, such as OIV, by a 1 electron transfer producing an organic radical intermediate and the second enzyme intermediate, compound II[4].

Compound II contains an oxoferryl group4 and is one oxidizing equivalent above the resting enzyme. A second organic substrate molecule is subsequently oxidized by a second 1 electron transfer reaction, thus reducing the enzyme back to its resting Fe(III)-heme form[4,8] and releasing a second water molecule. In the enzyme catalytic cycle, reduction of compound II is the slow step due its lower redox potential[6,7].

Figure 2

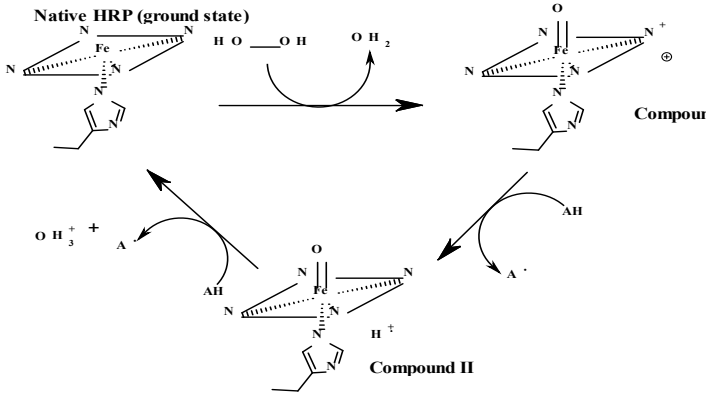

Figure 2. HRP heme group with distal histidine sidechain catalytic cycle of native HRP, compound I, and compound II.[4,7]

The fate of the organic radical is less prescribed. Unlike most enzymes, which discretely bind the substrate in an active site pocket and complete the conversion of substrate to final product, HRP extracts a single electron from the organic substrate via a collisional reaction with the oxidized iron-oxo heme group of compound I and compound II. The resulting organic radical is free in solution to decompose to a more stable two electron oxidized product via any number of routes, typically resulting in a mixture of final products[6,7].

Previous studies have shown that peroxidase enzymes oxidize azo dyes, resulting in complete decolorization of certain azo dyes, suggesting the loss of the azo linkage[9]. The initial reaction of the azo dye OIV and HRP was extensively studied using transient kinetic techniques. OIV is an azo dye with an amine group linking two phenyl rings (Figure 3). The amine group may function as an oxidation site during catalysis, protecting the azo linkage from oxidation.

Figure 3.

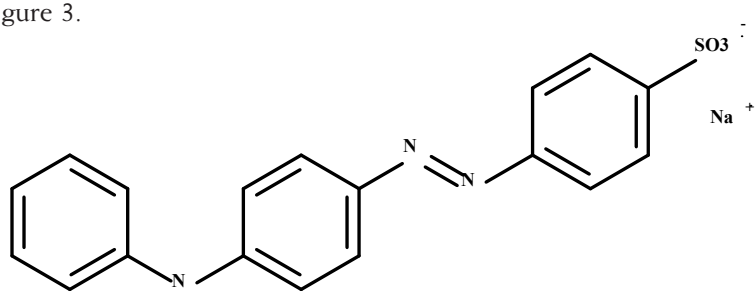

Figure 3. Structure of the azo dye, Orange IV sodium salt

The results showed the formation of two intermediate species which decayed to a final product with an optical absorption maxima in the visible range at 350 nm and 450 nm [unpublished results].

The structure of the final product was to be determined via liquid chromatography/mass spectrometry (LCMS) methods. However, during product collection studies it was noted that the optical absorption spectrum of the dye product continued to change after 200 seconds, the time period of the initial kinetic studies, indicating an incomplete reaction. The research described below are the transient kinetic studies of the reaction over 600 seconds. The rapid formation and decay of the initial intermediates is not well captured. The analysis focuses on the decay of the substrate peak (450

nm) and the formation of the final product peak (350 nm). The lambda max of the final product is between 330 nm and 350 nm, but was fit at 350 nm for our analysis. The rate constants for the final step in the oxidation of OIV were obtained by fitting the kinetic data using a nonlinear regression fitting program. It was expected that the final product was undergoing a slow intramolecular reorganization, independent of the enzyme or dye; however, as the results show below a second catalytic event may be occurring.

Methods

Reagents

0.05 M Ammonium Acetate Buffer

Ammonium acetate buffer was made from stock 1.0 M ammonium acetate buffer, pH 5.0 (University of Wisconsin – Stout) by dilution.

0.1 M Hydrogen Peroxide

Hydrogen peroxide solution was made by dilution from 30% hydrogen peroxide (University of Wisconsin – Stout) using 0.05 M ammonium acetate buffer solution. The concentration of H2O2 in the final solution was confirmed by optical absorption spectroscopy (e240 = 47 M-1cm-1)

Horseradish Peroxidase

HRP solution (HRP type VI – A enzyme (Sigma-Aldrich, St. Louis, MO) was made by adding a small amount of dehydrated enzyme to 0.05 M ammonium acetate buffer. Concentration was determined using optical absorption at 403 nm (ε_{403} = 100 $Mm^{-1}cm^{-1}$)[10].

Orange IV Dye

0.005 g Orange IV sodium salt (Sigma-Aldrich) was added to 4.0 ml 0.050 M ammonium acetate buffer and 1 ml acetonitrile (University of Wisconsin – Stout). Acetonitrile was used to increase the solubility of the OIV sodium salt allowing for higher dye concentrations to be used in the experiment.

Optical Absorption Spectroscopy

All spectroscopic measurements were conducted using a Hewlett Packard 8453A Diode Array Spectrophotometer using ChemStation Software version 10. The stopped flow instrument is an Applied Photophysics Rapid Kinetics Spectrophotometer Accessory. All kinetic data was collected at room temperature.

Stopped Flow Data

Time and calculation methods for spectrophotometer were set as follows:

Acquisition Range:	190 nm – 1100 nm
Run Time:	600 seconds
Start Time:	0 seconds
Cycle Time:	0.5 seconds

Two syringes were used in this experiment with a reaction volume of 500 ml. One syringe contained both substrates, hydrogen peroxide and OIV. The second syringe contained the enzyme. Trials were run in triplicate using differing enzyme and dye concentrations. Dye trials were accomplished using 26.6 – 426. μM dye concentration. Enzyme trials were accomplished using 0.497 - 15.9 nM enzyme concentrations. Concentrations of dye and enzyme were determined by optical absorption spectroscopy. Hydrogen peroxide concentration was consistent at 0.050 M in the reaction. Time traces at specific wavelengths were extracted at 350 nm and 450 nm to correlate with product and substrate absorbance, respectively.

Curve Fitting of Stopped Flow Traces and Exponent Extraction

Stopped flow traces were extracted at specific wavelengths as listed above for each trial. Traces were fit using an exponential decay equation with two or three exponential components using the curve fitting software, CurveExpert 1.4. The exponential values were compiled for comparison and grouped into rate constants. Rate constants that were within one order of magnitude were considered to represent the same rate constant.

Results

Dye Decolorization

As the reaction occurs OIV does not lose all of its coloring. As shown in Figure 4, the azo dye has an optical absorption maximum in the visible range at 450 nm. The spectra show the absorption at this maximum decreasing while an absorbance peak below 370 nm increases. The absorption peak that forms is stable at the end point of the reaction and results from the final product. Because the newly formed absorption peak is within the visible range, albeit at the UV end of the spectrum, the product does have a distinct yellow color to the naked eye. The known intermediate, with an absorption maximum at 580 nm, can also be observed as indicated in the figure; however, its formation and decay is largely missed over the longer time frame of this experiment.

Figure 4.

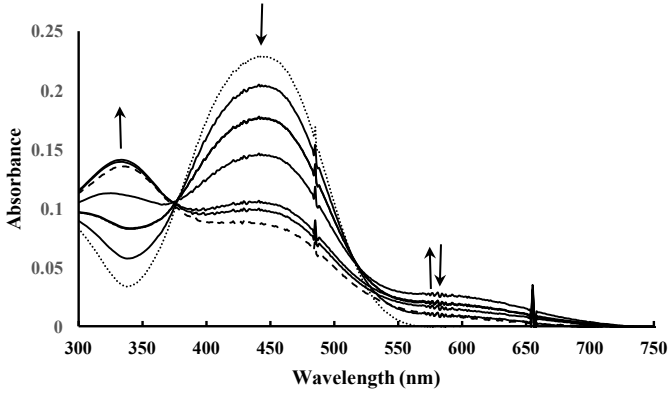

Figure 4. Multi time plot depicting absorbance separation of traces taken between 0 and 600 seconds. Traces were extracted between 0 seconds (···) and 600 seconds (- -). Solid lines (–) depict times between 0 seconds and 600 seconds throughout the reaction. The arrows represent absorbance changes as a result of ongoing reaction time.

Reaction Rates

Two different transient kinetic experiments were conducted. In the first experiment the enzyme concentration was varied while the concentrations of azo dye and hydrogen peroxide were constant (Figure 5). In the second experiment the concentration of the azo dye was varied; enzyme and hydrogen peroxide concentrations were constant (Figure 6). The reaction traces (absorbance as a function of time) at the specific wavelengths of 350 nm and 450 nm were fit to a 2 exponent equation to determine the rate constants values. The fitted rate constants were subsequently grouped and analyzed as a function of enzyme and dye concentration respectively. Consistently the reaction traces fit to two exponents, resulting in two distinct rate constants, separated by an order of magnitude. Table 1 shows the fast and slow rates for the enzyme experiment, clearly showing the two rate constants, which are designated as fast and slow.

Table 1.

Enzyme Concentration (nM)	Fast rate constant (s^{-1})		Slow Rate Constant (s^{-1})	
	350 nm	450 nm	350 nm	450 nm
0.50	0.0085 ± 0.0002	0.0106 ± 0.0007	-0.0007 ± 0.0001*	0.0015 ± 0.0001
4.0	0.0132 ± 0.0003	0.00104 ± 0.0006	0.0003 ± 0.0002	-0.0006 ± 0.0002*
8.0	0.0174 ± 0.0007	0.0183 ± 0.0019	0.0007 ± 0.0001	0.0056 ± 0.0003
15.9	0.0280 ± 0.0031	0.0276 ± 0.0029	0.0031 ± 0.0001	0.0054 ± 0.0001

Table 1. Rate constants for the fitted exponential data at different enzyme concentrations. Reactions were run in triplicate and fitted using the non-linear regression program. *A negative rate constant is not applicable to reaction kinetics. The result was included because a second exponent was use to fit all of the data.

The slow rate exponential fit proved difficult to fit as it represents a relatively small total change in optical absorption. In fact, twice, the slow exponent rate fit with a rate constant of a negative number, which is not applicable. However, removal of the second exponent from the fitting equation resulted in a poor fit of the curve as indicated by the calculated residuals.

Comparison of the reaction rates shows that substrate decays at the same rate as product forms. This suggests that there is a direct conversion of substrate to product. However, the fact that there is not a tight isosbestic point between substrate and product spectra (~380 nm, Figure 4) indicates that there are likely unobserved intermediates between the substrate and product. The formation and decay rate of any radical intermediate species are too fast to be observed under these reaction conditions.

Comparing the results of the two experiments shows that enzyme concentration and dye concentration affect the reaction rate differently. As shown in Figure 5B and 5D, the rate constants from product formation and substrate decay, respectively, are plotted as a function of enzyme concentration. Both product formation and substrate decay show a linear dependence on enzyme concentration. In contrast, the rate constants for product formation and substrate decay are independent of the dye concentration as shown in Figure 6B and 6D. This difference has marked implications for the reaction mechanism indicating that the final step of the reaction is another electron abstraction catalyzed by the enzyme.

Figure 5.

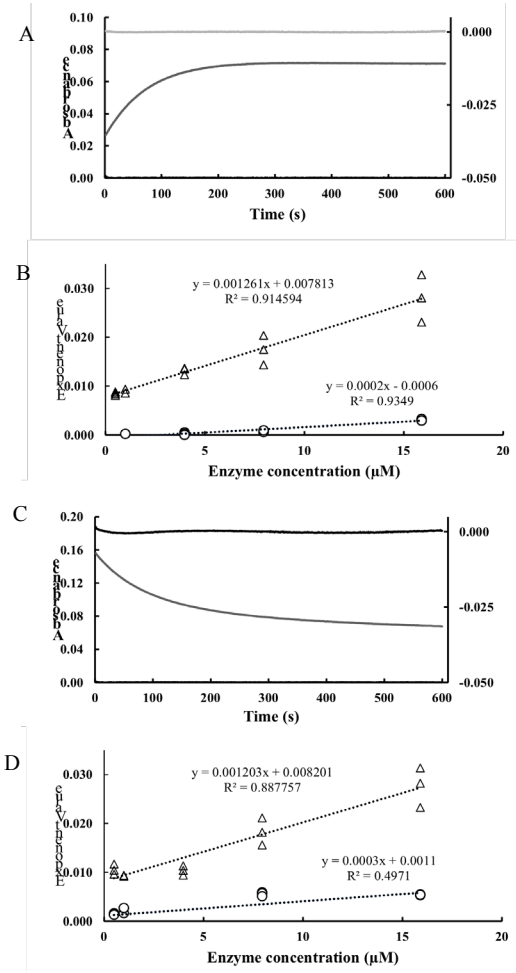

Figure 5. Comparison of rate constants in varying enzyme concentrations measured at 350 and 450 nm with trace and residual examples. Residuals (- -) were plotted with spectrophotometer traces (—) at 350 nm (A) and 450 nm (C). Enzyme concentration variations measured at 350 nm (B) and 450 nm (D) were collected in triplicate using a nonlinear curve fit (). Exponents' b and d represent different reaction constants (k). The fast rate (Δ) and slow rate (o) are both present with a linear trendline.

Figure 6.

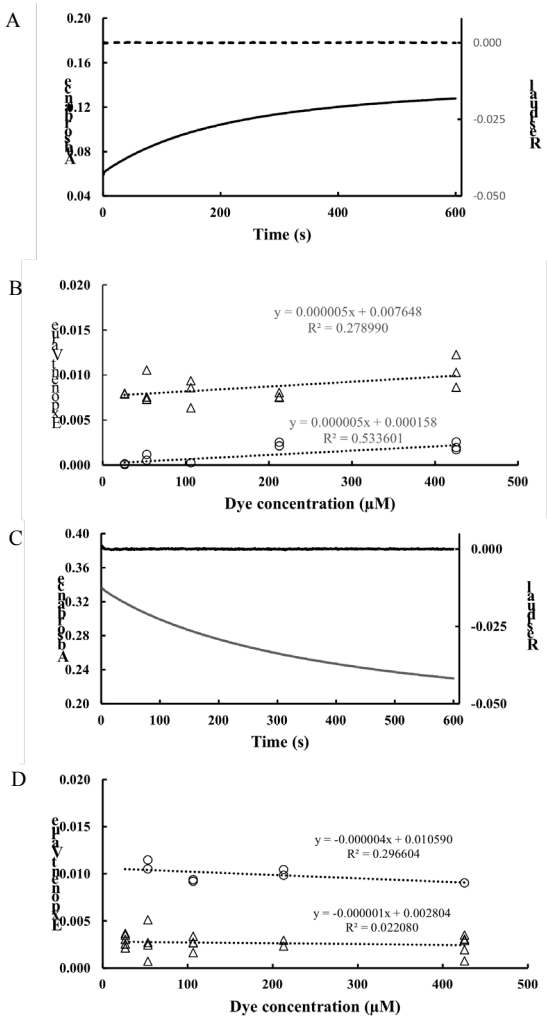

Figure 6. Comparison of rate constants in varying dye concentrations measured at 350 and 450 nm with trace and residual examples. Residuals (- -) were plotted with spectrophotometer traces (—) at 350 nm (**A**) and 450 nm (**C**). Dye concentration variations measured at 350 nm (**B**) and 450 nm (**D**) were collected in triplicate using a nonlinear curve fit (). Exponents′ b and d represent different reaction constants (k). The fast rate (Δ) and slow rate (o) are both present with a linear trendline.

Difference in the Final Product Absorbance Spectra

Because final organic product formation occurs in solution via radical decomposition, it is possible that changing the concentration of dye or radical intermediate would change product composition. Differences in product composition with absorption in the visible range would become apparent by comparison of the final optical spectra for reactions. The difference spectrum of the 600 s spectra for low and high enzyme concentration and dye concentration are shown in Figure 7 and 8, respectively. With the exception of more product formation at 350 nm, as expected, the spectra show no major differences caused by changes in concentrations in dye or enzyme. This indicates that the substrate radical follows a single major decomposition route to form the final product.

Figure 7.

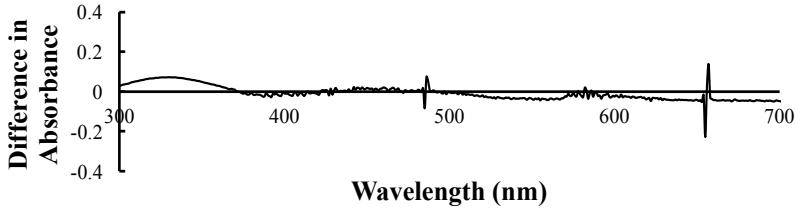

Figure 7. Difference in absorbance between 0.497 nM and 7.948 nM enzyme concentrations at 600 seconds. Difference in absorbance as a function of wavelength for the 0.50 nM enzyme concentration versus the 7.9 nM enzyme concentration at 600 seconds as described in methods. 600 seconds is last recorded data time in the reaction.

Figure 8.

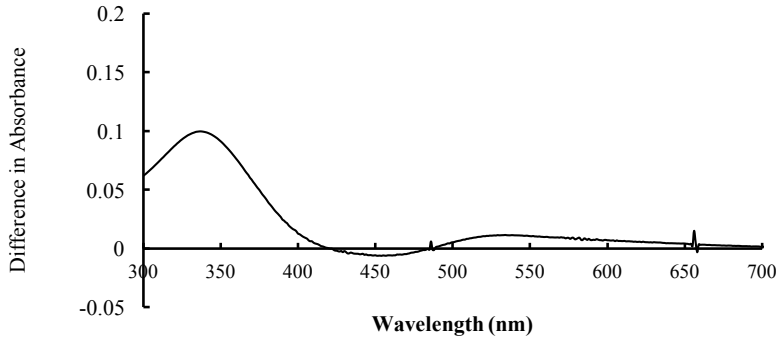

Figure 8. Difference in absorbance between 26.6 µM and 425.6 µM dye concentrations at 600 seconds. Difference in absorbance as a function of wavelength for the 27. µM dye concentration versus the 425.6 µM dye concentration at 600 seconds as described in methods. 600 seconds is last recorded data time in the reaction.

Discussion

Oxidative Decomposition of Orange IV

Previous kinetic studies showed that HRP rapidly oxidized OIV resulting in the formation of an intermediate (I-1) that spontaneously decayed to a second intermediate (I-2) that subsequently decomposed to an initial product (P-1), as shown in Figure 9. Based on the kinetic analysis it was proposed that both enzyme intermediates, cpd I and cpd II, generate the first intermediate (I-1). Cpd II controls the reaction rate as its reduction is the known slow step of the catalytic cycle. The structure of the initial product is unknown. However, because the product retains strong optical absorption in the visible range, it is likely that the azo linkage (-N=N-) remains intact. Oxidation of the amine group between the two aromatic rings may be a likely site for the initial reaction and formation of P-1.

Figure 9.

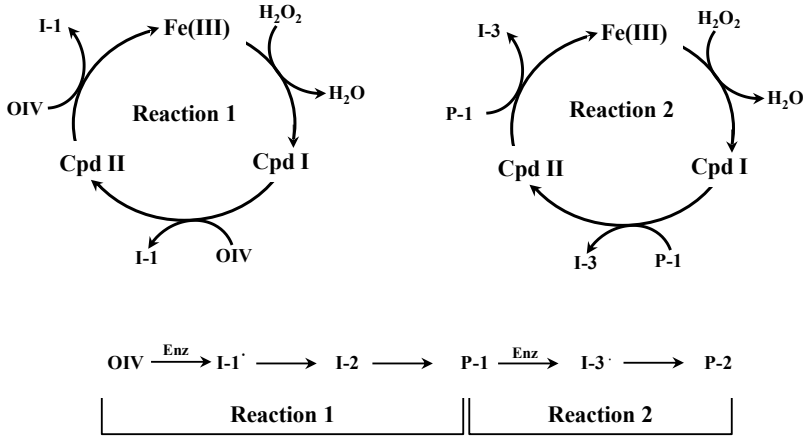

Figure 9. The proposed reaction scheme for the oxidation of Orange IV by HRP. This reaction scheme shows the enzyme catalyzing two different reactions on OIV as well as the stepwise conversion of OIV to the final product, designated as P-2.

P-1 was initially assumed to be the final product; however initial product analysis studies showed that the optical absorption spectra of the reaction continued to change at a slow rate, indicating the reaction was incomplete. The study here confirms this observation. There are two plausible explanations for the slow reaction given the reaction conditions. First, P-1 may undergo slow internal rearrangement to form the most stable final product since it is a large, conjugated structure. Secondly, HRP may catalyze a subsequent oxidation of the initial P-1 product. Because P-1 is an oxidized form of the azo dye, it is likely that further catalysis by the enzyme intermediates may occur at a significantly slower rate.

The results here strongly indicate that the continued slow reaction is due to further enzyme catalysis of the initial product P-1. Any slow intramolecular rearrangement of product or further decomposition would be independent of enzyme concentration. Depending upon collisional interactions with the dye this type of reaction may have shown some dependence upon dye concentration. As described above, the rate of substrate decay (450 nm) and product formation (350 nm) showed a strong linear dependence upon the enzyme concentration and was independent of dye concentration. This indicates that this slow change in the optical spectrum of the dye is indeed enzyme-catalyzed. A plausible mechanism accounting for this observation is proposed in Figure 9. The rapidly formed P-1 is a stable 2 electron oxidized form of OIV. This product is subsequently a substrate, albeit a poor substrate for HRP. Cpd I and cpd II slowly oxidize P-1 to another radical intermediate (I-3). This radical rapidly converts to the final product, P-2 with an absorption maximum in the visible range at 350 nm. The intermediate is not observed due to its rapid decay to the final product.

Conclusion and Future Work

The results above indicate that there is a second reaction catalyzed by HRP, converting the initial product P-1 to a second product P-2. There are two principle experimental methods to explore this possibility. First, upon reaction completion the product solution will be subjected to analysis by LCMS in order to determine 1) the number of prevalent products and 2) determine the structure of the product(s). Preliminary results of HPLC product analysis indicated a single primary product but further work is needed. Structural determination of the product(s) by mass spectrometry will facilitate determining if OIV underwent a single 2-electron oxidation or two 2-electron oxidation reactions, indicating 1 or 2 catalytic cycles by the enzyme per azo dye molecule, respectively.

The second experimental method utilizes transient kinetic methods

in which the oxidizing agent, H_2O_2 is limited. The stoichiometric addition of H_2O_2 at a 1:1 ratio to dye should limit the slow conversion of P-1 to P-2 as there will be no further oxidizing equivalents available. A difference in the slower reaction kinetics should be apparent and the optical absorption spectrum of P-1 obtained. P-1 may then be subjected to analysis and structural determination by LCMS as well.

It is the hope that by elucidating the mechanism of OIV oxidation and its subsequent products, that more information will be present for environmental remediation techniques and lead to less azo dye pollutants.

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Triumph and Tragedy of Early Christianity

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Abstract

This research aims to elaborate on women's influence on the formations of Early Christianity and their underplayed role in affecting Europe's intellectual movements. Women, both prior to and during the formation of Christianity, had been fully capable and passionate in their subverted attempts to contribute to society through intellectual, religious, and philosophical means. In these beginning years, there was reason to believe that Christianity's success would allow for a gender equality that was formerly not seen throughout history. Unfortunately, Christianity's institutionalization created ideologies that fundamentally undermined women's validity by the writing and coercive use of biblical scripture. Regardless of this tragedy, women proved, both prior to and within Christianity's history, they deserved the same sort of intellectual and societal respect that men have historically received. In this respect, history and even contemporary society can be viewed as misrepresentation and hindering of humanity's progression as a whole.

Keywords: Christianity, patriarchy, religion, philosophy, history, women, gender studies

This work's labor is to show that women have played a highly respectable role in the development of Christianity and ought not be left unmentioned. As the history will show, early Christianity had the potential to change how women were societally understood and represented. But first, it is necessary to establish a brief vision of the Western World prior to Christianity with respect to the rights and roles of women. To retain a reasonable scope for that aim, I will be primarily concentrating on the affects of Greek and Roman paganism on Christianity's patriarchy. This isn't to deny Jewish tradition it's essential role during this time in history, it is simply for brevity's sake. The upcoming loose narrative should be viewed as an allegorical as oppose to a summative illustration of this issue.

In the beginnings of Ancient Greece, the pantheon of gods as we recognize them today were significantly different. In its early formations, Goddesses were held in the high regard, deserving of grand shrines and

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frequent ceremonial worship. However, Greece's unification called for an assembling of diverse beliefs, which brought with it a patriarchal appropriation that we will later find is all too common with making religions mainstream. Historian Charlene Spretnak, elaborates on this:

> The pre-Hellenic Goddesses are powerful and compassionate, yet those whom the Greeks incorporated into the new order were transformed severely. The Great Hera was made into a disagreeable, jealous wife; Athena was made into a cold, masculine daughter; Aphrodite into a frivolous sexual creature; Artemis was made into a quiet, forgettable sister of Apollo, and Pandora was made into a troublesome, treacherous source of human woes (18).

This altering of feminine archetypes extended beyond a religious context and dictated a woman's ability to be respected in various aspects of society.

Pagan philosophical schools in the 4th century B.C., and for many years prior, had been denying women entry into schooling. Women for centuries would have to take extravagant measures or be born into extraordinary circumstances in order to receive the teachings readily available for men of wealth. For instance, Axiothea of Philesia was a woman living in Arcadia at the time of Plato's publishing of *The Republic*. She traveled to Athens out of admiration of the increasingly famous and well-received philosophy. To gain admittance, Axiothea would dress as a man. However, she isn't unique in this respect, a woman named Lasthenia studied Plato by the same means (Waithe 197).

Although women suffered more oppressive cultural norms than we have today, they still courageously and passionately sought knowledge and expressed great wisdoms. Philosophy has long been considered a masculine practice. The term *philosophy* is derived from the two Greek terms φίλος (fílos) and σοφία (sofía). The two terms, put in their original context, translate a "philosopher" to be a "friend of wisdom." The Greek language associates objects or concepts with masculine, feminine, or neutral traits. For example, the term for wisdom (sofía) is feminine. However, the term for friend (fílos) is directed toward the masculine. To be overly literal, philosophy means "a male friend of female wisdom." By such context, a place for women is not allowed in the term *philosophy*, regardless of wisdom itself being inevitably feminine. In this way, the very conception of philosophy, and its rhetorical use in the modern day, continues one of the many indirect perpetuations of patriarchy.

The wisdom of women was reserved for frivolous expressions, most notably poetry. In Plato's lesser-known work, *Ion*, he adamantly distinguished poetry from philosophy for this very reason. Plato and his successors would continue to isolate women from any practices that held a semblance of seriousness: philosophy, politics, rhetoric, mathematics, etc.

In spite of such initiatives, we find plenty of exceptions in the Ancient Greek Era, such as Theano II, Perictione II, Aspasia, Diotima, and Hypatia of Alexandria (Waithe). However, the theme of such exceptions is that they are most often only known through reference. To contemporary knowledge, their written works don't exist, or at least not anymore. In either case, the influence of the feminine intellect was stifled.

With these grounds we can see a brief vision of the intellectual climate for women in Ancient Greece. Considering the inheritance of Greek ideologies to the Roman Empire it is fair to say that this particular attribute of systematically disempowering women hadn't been rectified.

Fast-forwarding to Rome, we see a strong case against such systemization in a woman named Marcia. Oddly enough, she manages to take up Lucius Annaeus Seneca (The Younger) as her philosophical tutor. Seneca has been known largely for his philosophies on anger brought about by his position as an advisor to Nero's fury ridden rule of the time. However, Seneca's true polemic work was his piece, "Of Consolation: To Marcia."

The whole work is Seneca reacting to the intuitive wisdom of his pupil, Marcia and consoling her many traumas. Throughout the book, and presumably some of his others, Seneca used Marcia's intellect as a proofreader and tester of his philosophical claims. The oddest circumstance of this piece is that Seneca wrote it specifically for Marcia, thus the name "Of Consolation: To Marcia". While this doesn't sound too extraordinary for our time, it was unheard of for theirs. Even more unheard of is his display of a mutual respect for women:

> I know what you will say [Marcia], "You quote men as examples: you forget that it is a woman that you are trying to console." Yet who would say that nature has dealt grudgingly with the minds of women, and stunted their virtues? Believe me, they have the same intellectual power as men, and the same capacity for honourable and generous action. If trained to do so, they are just as able to endure sorrow or labour (Seneca, XVI).

Marcia, being the stereotypical image of a wretched old widow, immeasurably influenced Seneca's work by proving to him the philosophical merit a woman can bestow. With this consideration, one can begin to speculate on the true extent of women's influence on the great works of men that we still revere today.

The extent of women's influence is unknowable, because history, philosophy, religion, etc. has primarily received its testimony through men. With women's works being changed to male names out of coercion, women intentionally writing as men to be able to published, and women creating philosophies that men would display as their own, we can question what hasn't been influenced. Seneca's "Of Consolation: To Marcia," served as a call toward gender equality, but the systemic patriarchy of the time stifled its full impact. This is the state of women's influence during the time of Christianity's conception.

Roughly around this time, Mark and Luke record that a group of women had followed Jesus in his Galilean ministry, and that they were present at his execution and resurrection. However, his male disciples were absent with exception to John toward the end. Women saw the entirety of the crucifixion, carried Jesus to his tomb, and witnessed his resurrection. In this regard, Christianity's quintessential event, Jesus's murder and resurrection, reached the writers of the Bible most notably through the testimony of these women. Catherine Kroeger, a Christian History Institute academic, asserts women's strong influence during this crucial time in history:

> "The proclamation of the astounding Easter event was entrusted to these women. The angel reminded them that they had already been instructed by Jesus about His death, burial and resurrection. The women remembered and hurried off to tell the men. Their witness remains an integral part of the gospel to this day. The early church considered Mary Magdalene an 'apostle to the apostles' and Luke relied heavily on the testimony of women as he wrote both Luke and Acts."

In the first few decades after these events transpired, women took a major part in Christianity's initial development. Some examples of this are: "Priscilla, Chloe, Lydia, Apphia, Nympha, the mother of John Mark, and possibly the 'elect lady' of John's second epistle" (Kroeger). It can be confidently said that a significant portion of Christianity's first true messengers were women.

However, Christianity from a philosophical stance was an odd set of beliefs when its preaching first met the ears of the masses. Its patrons accepted tragedy as inevitable, fiercely denied a large range of well-accepted ancient gods, and believed in a finite universe with a distinct beginning and end along with a strong duality of afterlives. Pagan beliefs held the contrary position in many respects but one of the strongest distinctions was whether the universe was created or eternal. For Christians, the Creator's authority is unchallenged making him absolutely supreme. It is easy to assume that the common pagans at the time must have viewed these early Christians as strange and obnoxious folk who most certainly threatened the status quo. This new belief's accommodation of women additionally disturbed the mainstream paganism of the day.

An emblematic example of this, St. Justin Martyr (roughly 105-165 A.D.) was born a pagan at Flavia Neapolis in Samaria. Martyr was first introduced to Stoicism, then Pythagoreanism, and then Platonism, but none of these offered the answers he craved. While he was still a young philosophy teacher, he met an aged Christian man as he walked upon the seashore. By chance, he became acquainted with this virtually unheard voice. This experience overwhelmed the young philosopher. He took on the new identity to the fullest extent. It should be noted how deeply Martyr was swayed. Martyr's deepest questions weren't found in the many beliefs well established in his time; Christianity gave him a solace he hadn't felt before (Kiefer). Such is illustrated by his actions from this point on.

He continued to teach traditional beliefs until he made the large move to open a school of Christian Philosophy, one of the first of its kind. He then began to challenge non-Christian figures to formal debates and was accredited with being a ferocious debater. He served as a polemic figure and helped make Christianity something worth recognizing in the ancient world.

While gaining local credibility, Martyr left for Rome and he engaged the Cynic philosopher Crescens. Martyr emerged victorious and Crescens was rumored to have denounced him to the Roman authorities out of spite. He was charged with practicing an unauthorized religion and was judged before the Roman prefect Rusticus. Upon his hearing he refused to renounce Christianity, and was put to death by beheading along with six of his students, one of them being a woman. This "martyrdom" curiously points to this nameless woman. It was strange in this to time to see a woman executed, not to mention present in a school.

This narrative shows how powerfully Christianity captured the populace. By the grace of not being well accepted, Christianity became a haven for women, finally allowing them to acknowledge their deepest

expressions and in some cases even die for their beliefs. As we saw with the Ancient Greeks, the normalizing of a religion seems to have a negative impact on systemic impressions toward women. Respecting women was secluded to the peripheral of society and Christianity's initial notoriety provided a means toward female representation.

Although many of the women formerly mentioned are more religious figures, we find a strong example of a woman contributing to the philosophical underpinnings of Christianity in Macrina the Younger (Waithe 139). All the philosophical writings attributed to her were given on her deathbed and recorded by her brother, bishop Gregory of Nyssa.

Macrina's paternal grandmother, Macrina the Older, was a pupil of Gregory Thaumaturgos, a man well versed in Greek and Early Christian philosophies, and assumedly this is where both Macrina the Younger and her brother Gregory received their names. This upbringing in Christian ideologies brought the family controversy and led them to a state of hiding prior to Constantine's rise in power. Macrina was educated by her mother, Emmelia, and did not receive formal schooling like her three brothers did in Athens. Nonetheless, she proved to bear a sharp mind and a strong grip of Greek philosophy.

Macrina's deathbed philosophical testaments dealt heavily with the nature of the soul. She proclaimed that the one-ness and indivisibility of the soul are the guarantee that it is indestructible. The soul itself is the principal of life and is thus immortal. To use the words given, "the un-composite will not perish when the composite perishes" (Waithe, 141).

Macrina conceived that the soul is made in "God's image" and thus cannot contain what she refers to as "pathe" (the essence of desire and anger). The inner workings of pathe in us are not of the soul's conjuring; they are merely incrustations of it. The soul's essence, as opposed to pathe's, is the faculty for thinking. To Macrina, the soul and the body essentially belong together. When one's mortal body perishes, the soul then utilizes its spiritual body. The soul is an intermediary of corporeal and incorporeal vessels but is never without a vessel. The physical body's means of creating new life out of the nothingness of non-existence is of the soul's doing (Waithe 167).

Through all of her philosophical claims, she took no opportunity to be spiteful of men's metaphysical nature. She never posed the masculine and feminine as above or below one another. She felt that all are made in the "image and likeness of God." Her brothers, in their written philosophies agreed with this belief. This idea, however, was not commonplace and would soon be more dangerous than ever.

Regardless, Macrina serves as a perfect example of a women contributing to the structural beginnings of Christianity. Her beliefs and arguments offered a new philosophical system that blended the well-respected beliefs of pagans and the newly forming ideas of Christianity. Most importantly, her philosophies provided a gender-neutral orientation of Christianity.

By the 2nd century, records clearly states that women accompany men on mission trips, not as their marriage partners but as colleagues. This point can be viewed as the peak of female representation in the ancient world. Influence was gaining and women were able to finally foresee a future with their interests in mind.

This time in human history had the potential to change how women were societally represented. As Christianity became predominant, leaders became more aware of the apparent issue needing to be addressed. The nature of engendered souls and the identity of humanity as a whole were under question. Regretfully, the newly founded Antiochenes, a distinct band of male Christians inhabiting what we now consider Turkey in the 4th century, came to dictate this wide reaching subject (Harrison). Many Early Christians were progressive enough to believe as Macrina and her siblings did, that women and men were equal in God's image but this populace was the exception, not the rule.

The Antiochenes, however, generally came to believe that women were not in the image of God, but an "image of an image." This gave men a distinctive advantage over women, being that only men were in God's true image. Their statement was backed by the idea that Adam played as a victim to Eve's corruption in Eden. This was exemplified by God declaring in Genesis 3:17 that Adam was being punished, "because you have listened to the voice of your wife…." Women's punishment for Eve's corruption was "…your desire shall be for your husband, and he shall rule over you" (Genesis 3:16). This originating mythos is what helped pave way for other fundamentally derogatory interpretations of women and their place in this world.

Jesus was sent by God to do what Adam couldn't, transcend the world of sin. Women were credited for sharing a mutual humanity but discredited by their conception in Genesis from Adam's side. Being that man was made in the image of God, and women were made in the image of man, then women were an "image of an image." Diodore of Tarsus was one of the leading voices in the Antichenes school of thought. Author Nonna Harrison paraphrases his beliefs,

> For [Diodore] women and men are united in their common human nature, as shown by the creation of Eve from Adam's side, but they are divided by the fact that men possess authority and women do not. Thus the divine image actually serves to divide humankind rather than uniting it in a way that affirms the dignity of each person, as has become standard in mainstream Christian thought (Harrison 247).

Literal and out of proportion early Bible interpreters found the means to fundamentally undermine the idea of women. Such conclusions made it easy to force women into subordinate positions and deny their voices much like the pagans before them.

The depth of this issue is not solely dictated by just the tale of Adam and Eve. This rhetoric continues beyond the *Old Testament*. The true marking of Christianity is how it decided to distinguish itself with the New Testament. It is this moment, the pre-canonization, which held all the potentiality for reform on women's inherent worth. Viewing the compilations of the New Testament as the solidifying of Christianity as a mainstream religion, we see Christianity repeat the same misstep as the Greek Pantheon before them. This over-masculinization took the day and would affect the faithful indefinitely, such as in 1 Timothy 2:8-15:

> I desire, then, that in every place the men should pray, lifting up holy hands without anger or argument; also that the women should dress themselves modestly and decently in suitable clothing, not with their hair braided, or with gold, pearls, or expensive clothes, but with good works, as is proper for women who profess reverence for God. Let a woman learn in silence with full submission. I permit no woman to teach or to have authority over a man; she is to keep silent. For Adam was formed first, then Eve; and Adam was not deceived, but the woman was deceived and became a transgressor. Yet she will be saved through childbearing, provided they continue in faith and love and holiness, with modesty.

With such scripture available and a rising authority given to them in the Christian faith, early Christian scholars canonized their ability to remain dominant over women. Their strong presence in the creation and proliferation of Christianity's story made no difference in this regard.

We see this same stance practiced elsewhere in the New Testament. In 1 Corinthians 14:33-36 we read,

> As in all the churches of the saints, women should be silent in the churches. For they are not permitted to speak, but should be subordinate, as the law also says. If there is anything they desire to know, let them ask their husbands at home. For it is shameful for a woman to speak in church.

So what is the underlying intention of such verses? To keep to the ideas presented, women are innately erratic and ought to be repressed by the superior minds of men. .

With Christianity now institutionalized in the European world, scribes had full access to nearly all the writings of the Ancients. Bearing the world's knowledge they could now negate a strong history of women's ingenuity. We see this in the case of the female apostle Junia. Certain translations, such as: the Living Bible (1971), the NIV of 1973, and the New Jerusalem Bible wrote Junia in as Junias or Junian. Some have speculated that this misrepresentation started with Giles of Rome's translation in 1298 (Benger). However, intermittently throughout history, and especially in the modern day, you can find translations that represent Junia appropriately.

As shown, in some cases they would change the names of female writers or historical figures to be henceforth considered male or completely remove all evidence of their works although the ladder is difficult to prove. History, regardless of its magnitude, was altered to promote a male-dominated society. Historian Charlene Spretnak speaks on Christianity's effect on what was left of Goddess-centered religions,

> The new, patriarchal religion [Christianity] co-opted the older mythic symbols and inverted their meaning: The female Eve, was now weak-willed and treacherous; the sacred bough was now forbidden; and the serpent, symbol of regeneration and renewal with its shredding skins, was now the embodiment of evil. The Goddess religion and its "pagan" worshippers were brutally conquered, co-opted, and destroyed in Old Europe, the Middle-East, and India by Indo-European invaders (Spretnak 26).

The effects of this collective effort reverberate all the way into the modern day.

However, it wouldn't be fair to not mention the contrast. Many strong women were preserved in the canon of Christianity. Mary of Nazareth and Mary Magdalene played crucial and highly respectable roles in the narrative of the *New Testament*. Several other women received favorable references: Elizabeth, Anna, Claudia, Damaris, Lydia, Eunice, and Lois, just to name a few. In this case, it appears the *New Testament* did not have as much issue with specific women, more properly it rejected a system where men and women were put in equal bearing with one another.

With all of this in consideration, one can see that the history of Christianity is one of great triumph and great tragedy in regards to the fate of women. Its humble beginnings were one scarred by martyrdom and persecution yet it flourished so strongly that it overthrew ideologies that had been present for thousands of years as well as ideologies that bloomed from its own creation. The oppressed Christians, within a few hundred years, had managed to become the very thing that tormented them: the oppressor. With its new ideas causing inspiration among the masses, many ideas that we would consider ideal by today's standards were entertained. Its original conception reached the hearts of women and promised them a future that would be much more substantial than what the former pagan era allowed.

There was a time where women were gaining cultural respect that was well deserved with their avid contributions to the growing beliefs. But as history shows, the religion that they substantially helped create became twisted and manipulated to orient a system of beliefs that segregated and belittled the very women who fought direly to forge it and those who stood against it.

Through our contemporary ability, we can see that women played a highly respectable role in the development of the religion that is so commonly practiced today. The early figures of Christian belief, whether male or female, helped shape the foundation of which modern denominations bicker over. From Justin Martyr to Macrina the Younger, we see an ancient underdog belief system so potent that those cast under its spell would willingly give their lives in its honor and promise.

The tragedy of Christianity's institutionalization cost the world its mutual respect for women and traces of this still remain today. If we dare to question our own gender inequalities, we must question their origination and rationally see that the philosophical and biblical tenets that built this chasm between men and women are based on convoluted and coercive intentions. We should all come to know that history has generally and disturbingly undermined the integrity and worth of women all over the world, and this ought not be the case. If philosophy or religion cared for its own progression

toward truth, the idea of a majority of women's voices being intently unheard for the large extent of what we call "history" should shake its chambers. One should constantly re-contextualize the past and care to aid the voices of the underdogs of history and those among us today. Surely, we cannot arrive to a fully enlightened future without being able to represent the voices of all and any, with honest merit being our guide.

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Vegetation Biodiversity Response to Excessive Flooding in Permanent and Ephemeral Wetlands

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Abstract

Ephemeral wetlands vary greatly in water depth and animal diversity in a highly dynamic habitat. The vegetation response of these wetlands to flooding in comparison to their more permanent counterparts is poorly understood. Increased precipitation resulted in a significant mean wetland water level increase in 2014 compared to 2013. In both these years, we surveyed vegetation in 24 permanent and 33 ephemeral wetlands in the Chippewa Moraine region of Wisconsin. In general, cover, species richness, and Shannon and Simpson diversity indices were all significantly higher in permanent wetlands than ephemeral ponds. After one year of extensive flooding, we observed a loss of both species richness and cover in both ephemeral and permanent wetlands. Ephemeral wetlands exhibited slightly more biodiversity loss from flooding than permanent wetlands, although these differences were not significant. These results suggest wetland vegetation is affected by flooding. Our study provides a baseline of information for studies exploring future environment change.

Keywords: ephemeral, wetland, flooding, and plant communities

Introduction

Experts have long recognized that hydrology is one of the most important factors influencing wetlands (Mitsch and Gosselink 2015). Flooding affects vegetation in many ways. It causes a mass introduction of sediment in the water that blocks out necessary sunlight for photosynthesis (DeJager, Thomsen & Yin, 2012). Flooding also erodes the soil that holds these plants until they are uprooted, killing the plant. Understanding vegetation response to flooding can further improve the information on how we define and protect wetlands now (Veselka IV, Rentch, Grafton, Kordek, & Anderson, 2010). How vegetation responds to flooding in permanent and ephemeral wetlands tells us about their vulnerability to future climate fluctuations. Observing plant biodiversity response to flooding will help us understand how much diversity is distributed between wetland types (MacRoberts, MacRoberts, Rudolph, & Peterson, 2014).

Ephemeral wetlands are a source of unique plant biodiversity due to their frequently fluctuating water levels (Lukács, et al.). Ephemeral water levels periodically provide wet or dry conditions. In many human expansion situations, ephemeral wetlands have been replaced by permanent wetlands to prevent the net loss of wetlands for legal purposes. Permanent wetlands are more species-rich, but do not typically sustain flood resistant life for periodic flooding (Drinkard, Kershner, Romito, Nieset, & de Szalay, 2011). In contrast, ephemeral ponds hold plant life adapted to periodic flooding (Siebel & Bouwma, 1998)seedlings and vegetative propagules of woody species in a hardwood flood-plain forest along the Upper Rhine in France revealed that the occurrence of most species is significantly correlated to elevation above river level and light transmission in summer. Species confined to higher-lying sites which are only occasionally and briefly flooded in the growing season show most damage upon flooding. Tall herb species occur on sites where more than 5% daylight reaches the herb layer and they only reach a dense cover where flooding is occasional. The occurrence of woody juveniles is negatively correlated with tall herb cover and largely confined to more shaded sites or more frequently flooded sites. The results indicate that both shading and flooding are important for regeneration of woody species and for maintaining species diversity in hardwood flood-plain forests.","DOI":"10.2307/3237280","ISSN":"1654-1103","language":"en","author":[{"family":"Siebel","given":"Henk N."},{"family":"Bouwma","given":"Irene M."}],"issued":{"date-parts":[["1998",10,1]]}}}],"schema":"https://github.com/citation-style-language/schema/raw/master/csl-citation.json"} . Ephemeral conditions limit the abundance of competitive wetland species, giving opportunity for adapted threatened and endangered plants to flourish (Daoud-Bouattour et al., 2014). Different wetland types could have diverse vegetation responses to flooding. Permanent wetland vegetation may be less resistant because permanent wetlands do not experience as dramatically fluctuating water levels. On the other hand, ephemeral wetlands may be more susceptible because they are smaller in size and have lower species richness compared to permanent wetlands.

In this study, plant life in ephemeral and permanent wetlands was surveyed in years with average and above average precipitation. The plant data were used to calculate total cover, richness, and species diversity indices. Differences in these variables before and after flooding were analyzed between wetland types. We hypothesized that permanent wetlands would have significantly more vegetation biodiversity loss (species richness, total cover, Shannon's and Simpson's diversity indices) than ephemeral from flooding, because permanent wetland vegetation may be less adapted to extreme water level fluctuations than ephemeral wetland vegetation.

Methods

Sample collection

Data were collected as part of an ongoing study of permanent and ephemeral wetlands called the Chippewa Ephemeral Ponds Project, (supported by the NSF under Grant DEB-1256142.) This study surveyed 57 wetlands (24 permanent and 33 ephemeral) in the Chippewa Moraine State Recreation Area during the summers of 2013 and 2014. Quadrats were sampled along stratified-random transects so as to derive at least ten quadrats per wetland. At each sampling location, terrestrial and aquatic surface vegetation in a 1 m^2 quadrat was recorded for presence/absence of understory plants (< 1.5 m tall). A modified-Daubenmire method (Daoud-Bouattour et al., 2014) was used to obtain visual percent-cover estimates for each species. Aquatic plants that were present on the water's surface were recorded along with the water depth.

Data analysis

Data were compiled for all wetlands using Microsoft Excel, into five categories: water depth, species richness, total cover, Shannon's diversity (Drinkard et al., 2011)(), and Simpson diversity (Schen & Berger, 2014) () indices were calculated. Water depth is the measurement of water deepness (cm). Species richness is the number of different plant species. Total cover measures the amount of vegetation that covers the ground. Shannon's and Simpson's diversity indices are equations used to measure the community species diversity. Statistical analysis was conducted in the statistical software package R. A complete factorial two-way analysis of variance (ANOVA) was used to examine variance in richness, percent cover, and diversity indices between wetland type (permanent and ephemeral) and year of sample (2013-2014).

Results

Rainfall increased dramatically between 2013 and 2014, causing flooding in the Chippewa Moraine. Mean wetland water depth was significantly higher in 2013 (7.5 cm, SE = 1.4 cm) than in 2014 (28.5 cm, SE = 3.2 cm, $P < 0.001$, paired T = 2.00, df = 56, Figure 1). All categories of biodiversity showed a loss from 2013 to 2014, although not all were significant losses.

Figure 1

Figure 1

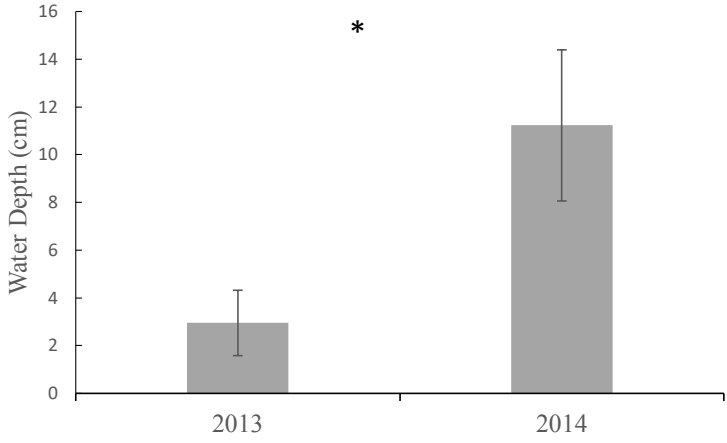

Figure 1. Mean water depths in 57 wetlands in 2013 and 2014, demonstrating a significant increase in 2014. Error bars are the standard error. Star indicates significant difference at $P < 0.05$.

Species richness was significantly lower in ephemeral wetlands ($F_{1,110} = 6.37$, $P = 0.013$), and had a significant loss between years ($F_{1,110} = 5.94$, $P = 0.016$, Figure 2). Ephemeral ponds lost more species, although this interaction term was not significant ($F_{1,110} = 0.24$, $P = 0.625$).

Figure 2

Figure 2

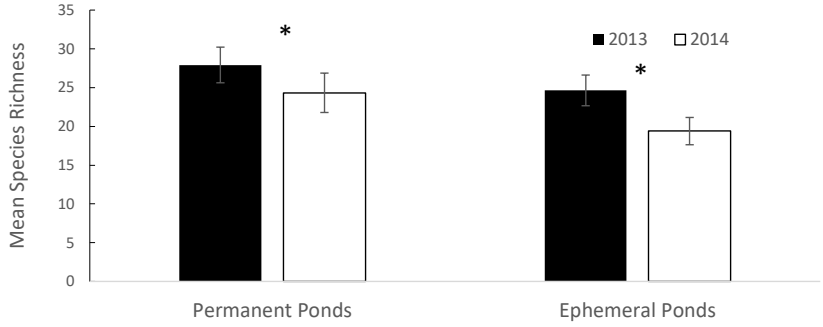

Figure 2. Mean species richness in permanent and ephemeral wetlands in 2013 (pre-flood) and 2014 (flooded). Error bars are the standard error. Star indicates significant difference at $P < 0.05$.

Total percent-cover of vegetation also had a significant difference between class ($F_{1,110} = 36.67$, $P \leq 0.001$) and year ($F_{1,110} = 6.74$, $P = 0.011$, Figure 3). Permanent wetlands lost a larger amount of cover than ephemeral ponds, although this difference was not significant ($F_{1,110} = 0.21$, $P = 0.655$).

Figure 3

Figure 3

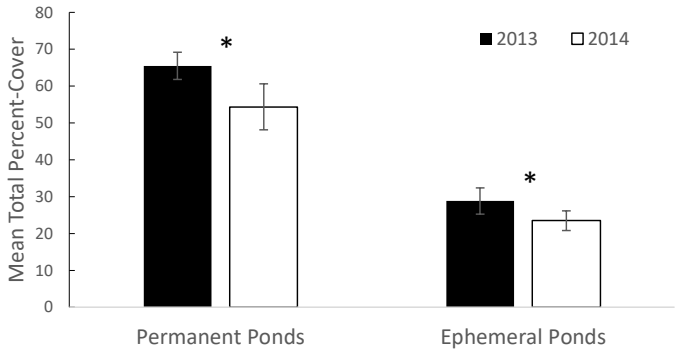

Figure 3. Mean total percent-cover in permanent and ephemeral wetlands in 2013 (pre-flood) and 2014 (flooded). Error bars are the standard error. Star indicates significant difference at $P < 0.05$.

Shannon and Simpson diversity indices were both significantly higher in permanent wetlands than ephemeral ponds (Shannon: $F_{1,110} = 15.80$, $P \leq 0.001$ and Simpson: $F_{1,110} = 16.11$, $P \leq 0.001$). There was no significant decrease in either diversity index from 2013 to 2014 (Shannon: $F_{1,110} = 1.68$, $P = 0.197$ and Simpson: $F_{1,110} = 0.964$, $P = 0.328$, Figures 4 and 5). Neither interaction was significant.

Figure 4

Figure 4

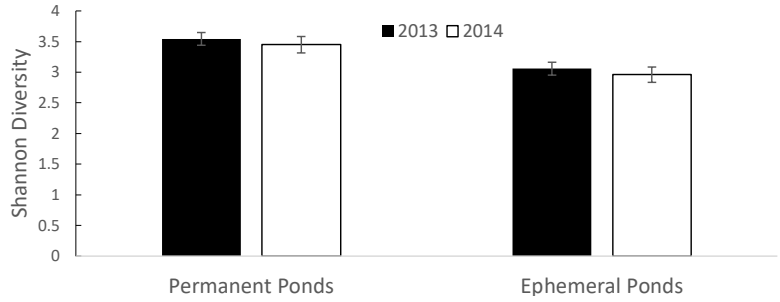

Figure 4. Mean Shannon diversity index in permanent and ephemeral wetlands in 2013 (pre-flood) and 2014 (flooded). Error bars are the standard error.

Figure 5

Figure 5

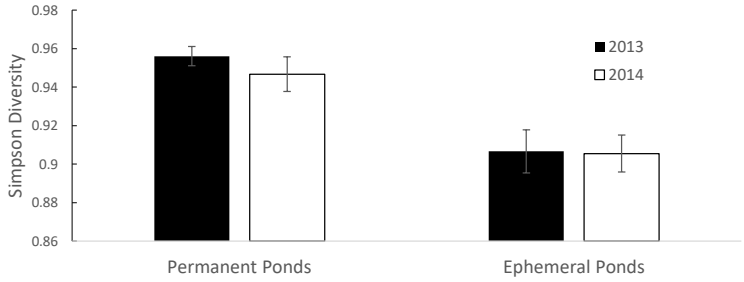

Figure 5. Mean Simpson diversity index in permanent and ephemeral wetlands in 2013 (pre-flood) and 2014 (flooded). Error bars are the standard error.

Discussion

Flooding in the Chippewa Moraine resulted in a loss of plant biodiversity in both ephemeral and permanent wetlands. Wetlands had significant losses in species richness and total cover from 2013 to 2014. Ephemeral wetlands lost slightly more species richness than permanent wetlands. The severity of flood disturbance could have varied for wetland types. Permanent wetlands did not lose as large a proportion of biodiversity because they had a larger amount of plant biodiversity in 2013 (pre-flood). Because ephemeral ponds have a lower plant biodiversity to begin with, it is more difficult to resist large amounts of species loss (Rhazi et al., 2011).

These small ephemeral plant communities will have less vegetation available to recover from large plant biodiversity loss, whereas permanent wetlands have lost a large amount of vegetation but still have a large amount of vegetation to recover from flood disturbance.

Many wetland plant communities adapt to aspects of flooding. Flooding carries increased nutrients that wetland plant communities use to stimulate growth (Drinkard et al., 2011). Many wetland plants have adapted to survive with poorer sunlight in flood conditions (Siebel & Bouwma, 1998) seedlings and vegetative propagules of woody species in a hardwood flood-plain forest along the Upper Rhine in France revealed that the occurrence of most species is significantly correlated to elevation above river level and light transmission in summer. Species confined to higher-lying sites which are only occasionally and briefly flooded in the growing season show most damage upon flooding. Tall herb species occur on sites where more than 5% daylight reaches the herb layer and they only reach a dense cover where flooding is occasional. The occurrence of woody juveniles is negatively correlated with tall herb cover and largely confined to more shaded sites or more frequently flooded sites. The results indicate that both shading and flooding are important for regeneration of woody species and for maintaining species diversity in hardwood flood-plain forests.","DOI":"10.2307/3237280","ISSN":"1654-1103","language":"en","author":[{"family":"Siebel","given":"Henk N."},{"family":"Bouwma","given":"Irene M."}],"issued":{"date-parts":[["1998",10,1]]}}],"schema":"https://github.com/citation-style-language/schema/raw/master/csl-citation.json"} . These plant adaptations could be from the consistent exposure to flood disturbance (Toogood & Joyce, 2009). The isolated Chippewa Moraine wetlands do not receive regular flood disturbances, so flooding results in significant loss of plant biodiversity when flood disturbance occurs. These plant communities may lack adaptations to endure the negative effects of flooding and take advantage of flooding for seed dispersal or nutrient absorption. The study of vegetation response to flooding should be continued in order to understand if the wetland plant communities of the Chippewa Moraine will sustain or diminish from flood disturbance.

Shannon and Simpson diversity indices showed no significant differences from 2013 to 2014, although there were in losses in total cover and species richness. Both Shannon and Simpson indices account for evenness in the abundance of species and species richness. Losses in total cover could have created a greater evenness in the species abundances by suppressing some of the more abundant species. Even though there were losses in total cover and species richness, the amount of plant life post-

flooding was more evenly distributed. Increased evenness combined with decreased richness meant that there were no significant changes from year to year in the Shannon and Simpson diversity indices.

Continued flooding in these wetlands could have implications over time. There was a significant plant species richness and total plant cover loss in both types of wetlands (permanent and ephemeral). Due to their smaller size and initially lower species richness, ephemeral pond plant communities may be less resistant to disturbances like flooding. In the conservation of ephemeral and permanent wetlands, the progression of flooding and plant biodiversity should be monitored and observed (MacRoberts et al., 2014). As the climate fluctuates, flooding will have an impact on these wetlands, but the long-term consequences remain to be seen. Increased flooding frequency is likely to decrease species richness and total vegetation cover, regardless of pond type.

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Why Don't More Student Athletes Study Abroad?

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Abstract

This research focused on why student athletes tend to not studying abroad. Student athletes at the University of Wisconsin-Stout were asked to take a survey concerning why had they not gone abroad throughout their time on campus, what were the factors that prohibited them from going abroad, and whether they even wanted to go abroad. This study also looked at how many of those students were male and female, and how many sports they were involved in. Suggestions can be offered on what the international office could do better to make student athletes more aware of the programs offered for students who have a hard time going abroad because of the demands of their sport. The research concluded that there are multiple issues that affect the priority of going abroad such as cost, time, available opportunities, lack of awareness, and major alignment with current offerings for study abroad programs.

Keywords: study abroad, student-athletes, international education

Introduction

Studying abroad has been known for its amazing opportunities and for the positive effect of increasing levels of cultural competence throughout many universities and colleges (Dessoff, 2006). Yet, research has shown that student athletes are a population that has not been pushed enough or possibly made aware enough of their opportunities to go out and see the world through a different lens (Dessoff, 2006). Why is this important? Students may be missing out on opportunities that they are possibly not aware of, and they should have a fair understanding just as well as the students that do know more about studying abroad. There are a number of reasons why student athletes do not go abroad such as cost, time, or unawareness, but this component of a secondary education is rewarding and vital to help students gain more knowledge about the world and other cultures (Dessoff, 2006). Giving student athletes the same opportunities as students who are not in sports is something to strive for if a university goal is to have fairness and inclusion for all.

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Research has shown that a variety of factors play into student athletes list of priorities when it comes to their academics, social, and personal life (Potuto & O'Hanlon, 2007). One of the many challenges today for students on our college campus is leaving their comfort zone in order to explore other things. A lot of student athletes are treated as athletes first and students second, which could dictate their decision not to go abroad (Potuto & O'Hanlon, 2007). This population of students tend to put so much focus into school and sports that they tend to miss out on other social aspects of their college life. With the two curricular and co-curricular activities being their main concentration, they value their athletic participation and believe that it both instills values of independence and enhances particular skills and their overall college experience (Potuto & O'Hanlon, 2007). These are perfect examples of why student athletes do not go abroad enough; however, working with an international office to help accommodate students that desire to go abroad would help make their college life more meaningful and significant.

The research investigated how many student athletes study abroad, what percentage of them are male and female, what is preventing them from going abroad, and if they have been abroad, what term they attended school. The purpose of the survey was to understand the reasons or barriers why there is a lack of student athletes studying abroad compared to the general student population. Data was collected with a survey that asked student athletes to identify the existing barriers to studying abroad. The results of this research will bring more awareness to the international education office on campus so they can make greater efforts to help student athletes to go abroad, whether if it is during the summer, spring, fall, or winter.

Literature Review

For years going abroad has been an essential key to help students increase knowledge of other cultures, learn a language, provide opportunities to travel, learn more about themselves, enhance employment opportunities, and overall enhance the value of one's degree. Studying abroad is a well-known university experience for students that allows them to get exposure of other foreign countries' institutions (Costello, 2015). A numerous of expected and unexpected lessons are gained when going abroad such as picking up new habits, gaining new views on world issues, experiencing new food, experiencing different weather and environments, and making new friends from different parts of the world. What makes studying abroad interesting is that the United States is not the only country that participates in this global experience; many other countries do as well (e.g. United Kingdom, Pacific

Islands, South America, etc). This bonds majority of the countries together because of the importance of students getting a global experience, gaining cultural competence and being able to apply the skills learned into their daily life and workplace (Costello, 2015).

Going abroad is one of the most life-changing experiences of college and there are many benefits that go along with it. The one thing about studying abroad is that the benefits outweigh the barriers because there is so much that will come out of the experience. One benefit is the likelihood of changing one's opinion about the countries about which one has heard negative things (Costello, 2015). The media does view other countries in a negative light that is not always true, but one thing to remember about studying abroad is that a student's home institution would never send them to a country that is not safe. Another benefit is developing the skill of self-reflection, thereby oneself and discovering things that one probably never knew (Costello, 2015). When being abroad, a great thing a student gets to do is learn more about their own country from the perspective of the host country. Knowing who you are is a big part of shaping your personality. Being away from everything with which the student is familiar and finding him/herself in an environment alone will help bring out a part of themselves that the student has not nourished. According to Costello, living without parents requires hard work and tough decision making and being abroad helps get that experience in adulthood in another country. Costello also states learning languages is another great benefit of going abroad, because it can add a large amount of value to the student's degree and help develop a career that requires a second language. Being bilingual is always a great skill to have in any workplace. Even though there are great benefits to going abroad, there are also barriers that can result in conflict.

Race/Ethnicities/Gender

Going abroad is a great resource for students in regards to seeing the world, but one cannot deny that there are certain groups of people who are traveling to other countries more than other groups. Statistics show that more females tend to go abroad than males. A study shows 191,321 in the year 2003-04 up to 9.6% over the previous year most of the students that went abroad were Caucasian women (Dessoff, 2006). Females outnumbered Caucasian males nearly two-to-one. The lack of male student representation in study abroad programs is possibly rooted from decades of old practices, which could be the reason why more women than men tend to go abroad. One of the possible reasons why more females go abroad goes back to the eighteenth and nineteenth century practices of sending affluent daughters

to finish schooling in countries like Switzerland (Dessoff, 2006). Even though this happened in the past, it is still a fairly common part in today's college life. From the years 2001 to 2002, nearly two-thirds of study abroad participants were women (Luo & Jamieson-Drake, 2015). Even in recent years the shift in students going abroad hasn't changed; women are still going abroad more than men.

Students of color face many different challenges when going abroad, more or less because of financial strains (Luo & Jamieson-Drake, 2015). Also, most first generation students of color come from families that do not value going abroad as much as a middle-class Caucasian family or parents who have college degrees. Why? For students that are first generation and leaving home for the first time, it can be one of the toughest experiences they face alone, and encouraging them to go abroad alone doesn't make it easier (Luo & Jamieson-Drake, 2015). There are multiple reasons why underrepresented students do not go abroad and research show that there are disparities between students of color going abroad counterparts. (Paus & Robinson, 2008).

Academic Programs/Majors

Students in any major can go abroad no matter which type of program they are in; there are hundreds of courses out there that are beneficial to students learning in the host country that follow certain academic requirements. Majors and GPA's are big factors that play into a student's decision to go abroad, depending on the home institution. Each university has their own set of requirements that have to be met for students to have the option to go abroad. A lot of students do feel the pressure when it comes to having a GPA that is suitable to go abroad (Paus & Robinson, 2008). When going abroad and transferring back credits to their home institution, grades are not transferred back, only the credits, which in many cases doesn't affect a student's GPA. Their GPA will remain as it was before they went abroad (Peter & Petzold, 2014). Depending on the academic program/major there are certain requirements that student athletes may have to follow in order for their program requirements to be met.

Numerous major programs participate in study abroad, areas such as social science, languages, the arts and humanities, and even mathematics (Paus & Robinson, 2008). Out of various majors, areas of humanities (32.4%) and language (51.9%) report a higher percentage of encouragement for their students to study abroad compared science related majors (25.7%) and social sciences (31.6%) (Paus & Robinson, 2008). Shown through the statistics, science and social science majors may play a part in why student athletes may not study abroad depending.

It is a wonderful experience taking major classes in another country, but most students do worry about passing the courses in their host country. A total percentage of 57% of students do worry about the struggle of fulfilling their major requirements (Doerr, 2014). In addition, a small percentage of students aren't aware that you can also take general courses like math, sciences, literature, or even gym abroad and still earn college credits to transfer back.

Student Athletes/Time Commitment

Student athletes all have different backgrounds and reasons why not to go abroad, but the few similarities that categorize them together is their commitment to their sport and the time and effort they put into becoming better athletes. More or less, they also have the commonality of not going abroad because of their sports, which in some cases could be a good or a bad thing depending on the situation. A lot of the student athletes are treated as athletes first and students second and most times that could dictate their decision to go abroad (Potuto & O'Hanlon, 2007). The group of students in the survey tend to put much of their effort and focus on schoolwork and sports so that they pass up the opportunity to go abroad and experience other cultures. With those two curricular and co-curricular activities as their main concentration, they value their athletic participation and believe that it both instills values of independence of those deprived aspects of college life and enhances particular areas of their overall college experience (Potuto & O'Hanlon, 2007). The vast majority of student athletes have and are still going by these principles within the student population. Student athletes spend majority of their time focusing on school and their sport and do not see studying abroad as an opportunity.

Most student athletes can't go abroad due to time commitment and loss of positions on teams. Some students do not want to leave because they have financial difficulties, relationships, or even family issues. Student athletes are still normal students as well and often tend to have some of the same problems non-athletic students experience, depending on what type of school the student athlete goes to and/or what type of division their school is ranked in sports (Bell, 2009). Student commitment also varies depending on the division. Schools require more practice and training time to keep their team in good standing, which can affect students going abroad because the student is always training and going to camps to stay in shape for the upcoming season (Bell, 2009). Most student athletes are influenced by their coaches and trainers in the sports field because they are the ones that are guiding them in their athletic career and helping them in any way as possible.

With the level of commitment to their schoolwork and sport it may cause a much heavier load of responsibility for student athletes, which can restrict them from going abroad.

In addition, losing team positions was a common concern for student athletes in this survey, and one of the biggest reasons why they didn't want to leave their team temporarily to go abroad. Research shows students work hard for years to make it into positions that they possibly dreamed of, and going abroad would take that position away from that student because it cannot be held unfilled or inactive while they are away (Potuto & O'Hanlon, 2007). On the other hand, depending on the host country, there are possible opportunities for student athletes to play intramural sports. Student athletes can spend up to 20-30 hours a week with their team training and practicing, dedicating so much time and effort to something like sports and to go abroad and lose what they work hard for can be a tough decision to make. They have become a family with their teams and have become more in tune with the sport. Giving all that up for a semester or year in another country is not much of a priority for student athletes (Bell, 2009). Giving student athletes the choice to go abroad is the main issue that is not happening on most college campuses. Letting them know about the opportunities and giving students a chance to pick for themselves would be much more beneficial than them not knowing what type of opportunities they could have by going abroad. Overall the way sports are structured makes it difficult for student athletes to decide whether to go abroad or stick to their sport because they may not maintain their rank/position.

Socioeconomic Background

A student's financial background does play a great deal into them going abroad. Each student comes from a different background in general, but most minority students tend to face financial difficulties because of possibly being first generation and coming from low-income or single-parent households (Dessoff, 2006). This population of students has to search for more funds for their trip if they aren't offered enough in financial aid to cover the full cost of going abroad. What most students do not know is that their financial aid in general can help pay for their trip abroad. Depending on the host school and the location of the school, it may be that financial aid is enough to cover the whole cost of the trip (Anderson & Lawton, 2011). In general, not all countries have expensive tuition.

One thing that could also help students to not spend much money on going abroad would be considering short-term study abroad programs. The short-term study abroad trips are mainly led by faculty that are current

professors at the student's home institution. This is also is a great benefit because the trip is typically related to the student's area of study and what the professor teaches (Loh & Steagall, 2011). This type of program is an option that students with financial hardship could possibly look into, if going abroad for a semester or year is too much for them to afford. Short term programs can range anywhere between $300-3500 depending on the country (Loh & Steagall, 2011). Also, there are grants and scholarships that students can apply for that can cover their tuition. This takes the pressure off students who are searching for these funds to go abroad. International Education offices on college campuses would be a great source to find all the information needed for looking for grants and scholarships.

Seeking out the resources around their campus would be a big factor if the students are not feeling competent enough to look alone. Talking to students who have already been abroad can be beneficial to students seeking a study abroad experience because the former students have already gone through the process of being abroad. Drawing on the insights of seasoned travelers may help prospective students to get where they want to be in their process (Dessoff, 2006). Financial stress can be a burden for most college students and effect their chances of going abroad.

Methodology

Overview

A number of student athletes at the University of Wisconsin-Stout were sent a survey of questions regarding their experience with studying abroad or asking if they have ever studied abroad. The survey was composed of nine questions that were simple and straightforward. The questions are listed below:

1. What is your gender?
2. What year are you?
3. What is your undergraduate major?
4. Do you participate in any intercollegiate sport?
5. If yes, which sport?
6. Have you ever studied abroad at UW-Stout?
7. If yes, when?
8. If not, what prevented you from studying abroad?
9. If other, what was the reason(s)?

Participation

Planning, Assessment, Research & Quality (PARQ) services office at the UW-Stout campus was utilized for this research. The survey was sent out to 250 student athletes randomly, and 30% of the student athletes responded. This survey specifically focused on student athletes and the survey was kept anonymous.

Materials

Qualtrics survey software was used to send out the emails to the student athletes on campus. PARQ was utilized to get the emails of the students athletes here on campus.

Procedure

At the beginning of the process, a hypothesis was developed in relation to UW-Stout student athletes and created a survey of questions asking about study abroad experience. A survey was created through Qualtrics software to submit with the Institutional Review Board (IRB) application. The materials were sent in early March and received approval two weeks later. The PARQ office on campus was contacted to request 250 student athlete participants to send the survey to. The survey was distributed to those students through Qualtrics survey software. After all the responses were in, the results were analyzed through Qualtrics and the final results were looked at in mid-May.

Results/Discussion

The data collected were analyzed to find out the reasons why student athletes do not take part in study abroad opportunities on campus. The data was collected via a survey administered through Qualtrics. Information on a student's gender, major, and year in school was collected and the survey was administered to an equal amount of female and male students.

41 male student athletes responded to the survey, 48.24% of the total number of respondents; and a total of 44 female student athletes responded to the survey, 51.76% of the total.

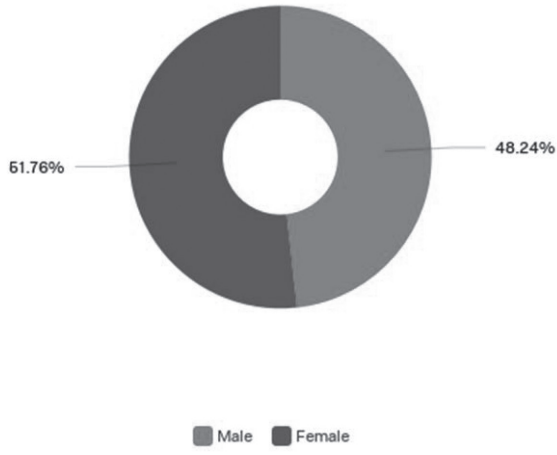

Figure 1 shows the amount of male and female student athletes that responded to the survey. The breakdown of genders was close to 50% male and female with a 3% difference. Fact that there are more females than males that have taken this survey drew attention to how many of these females and males have been abroad.

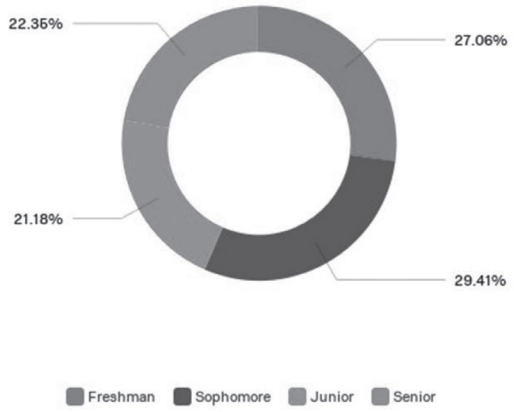

Figure 2 shows the amount of student athletes by year in college. A total of 23 respondents were freshmen (27.06%) and 25 respondents were sophomores (29.41%). A total of 18 student athletes who were juniors (21.18%) responded and 19 student athletes who were seniors (22.35%). The data shows as the students moved from freshmen's to seniors the number of students interested in studying abroad started to decrease, possibly because the amount of dedication to their studies increased the longer students spent in college. From the pie chart it seems that freshmen and sophomores were a lot more responsive; they had more interest than the upper classmen did. There is a possibility that the under classmen may have had more dedication to study abroad than upper classmen because of the more demanding roles and classes they take on as juniors and seniors. Excelling in their individual sports may require more time and dedication, especially if they want to hold their positions in their sport. There are a numerous of possibilities that do confine student athletes to their sport and academics. Even though each student is different and probably has different reasons for not studying abroad, just letting them know that there are opportunities there for them if or whenever they choose to go abroad opens up the possibilities for them.

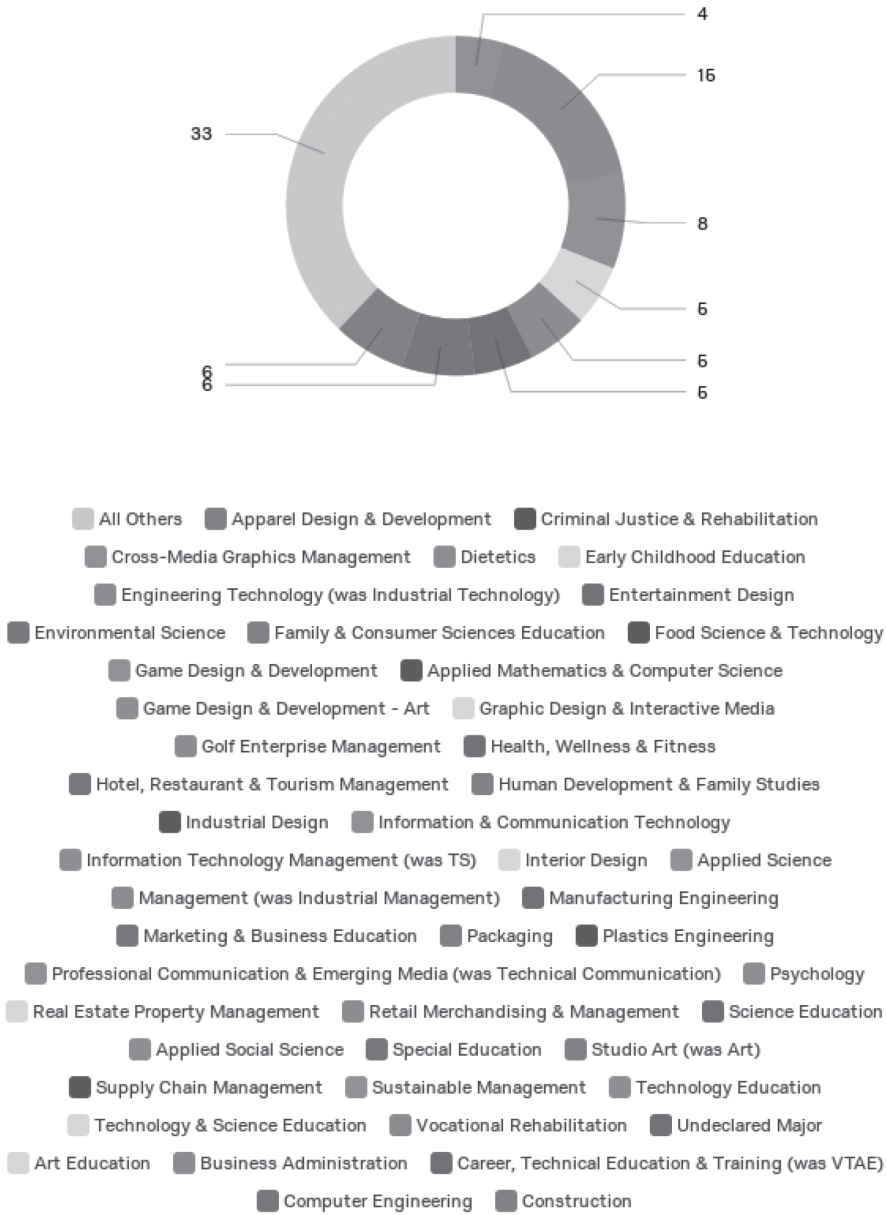

Figure 3: Participants Academic Majors

The literature sources showed that majority of the students that are studying abroad were majors that are considered social science, mathematics and humanities (Paus & Robinson, 2008). Not too many students were in art or design classes because those types of majors required more time spent outside of class doing drawings, art, etc. Additionally, practices and training may complicate the students involvement in sports and may compromise their positions.

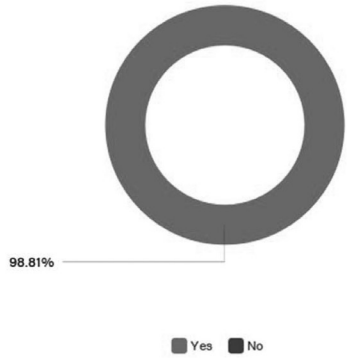

Figure 4: Percentage of Participants in Intercollegiate Sport on Campus

Out of 84 respondents there was a total of 83 student athletes (98.81%) who stated they were in an intercollegiate sport on the UW-Stout campus. Even though all respondents selected were athletes one student athlete (1.19%) said no to being involved because of possibly leaving their sport. This was to be expected from each student because the survey was only sent to student athletes.

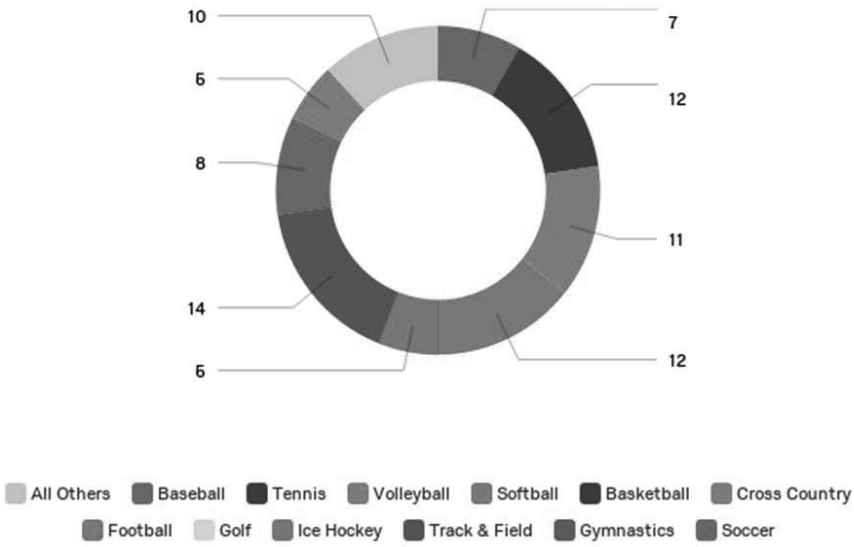

Figure 5: Breakdown of Sports Participants were involved in

This pie chart shows the number of sports that UW-Stout offers and the number of student athletes in those sports. The data also shown that the three top sports that most students are part of is track and field, football, and basketball.

Figure 6: Percentage of Athletes that have Studied Abroad

This pie chart shows the amount of students that have not been abroad and the ones that have been abroad. A total of 74 student athletes (87.06%) responded not having been abroad. A total of 11 student athletes (12.94%) responded that they had been abroad. The majority of the student athletes said They had not gone abroad because they spend so much time in

their sport that they feel that they do not need to go abroad. They put more of their effort and focus on school work and their sport and did not plan to incorporate going abroad into their plan (Potuto & O'Hanlon, 2007). Out of the many reasons why student athletes do not go abroad, time has been one of the largest responses. For the athletes, it seems that time is their ultimate challenge. Finding ways to stay dedicated to their sport and academics at the same time as trying to go abroad is a problem. Seeing going abroad as a priority doesn't guarantee that the students aren't interested; they possibly haven't found a concrete plan to balance everything without risking anything. There is also a chance that most student athletes do not understand or aware of the great benefits of going abroad. For example, learning about new cultures, languages, or experiencing new ideas. Student athletes could take what they have learned abroad and bring it back to possibly teach their teams or classmates new things that could maybe change their lives.

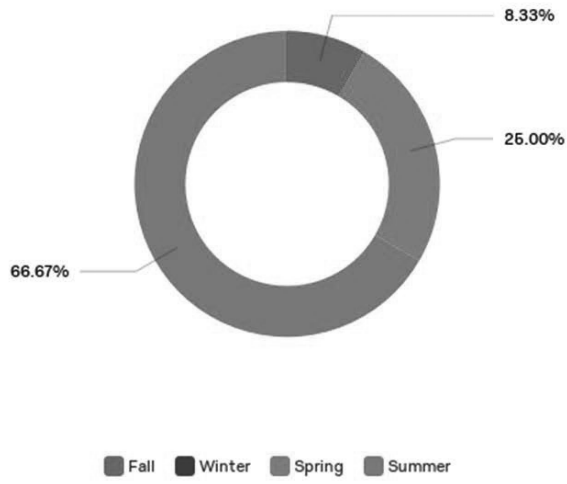

Figure 7: Time of Year Athletes Studied Abroad

This pie chart shows a total of 1 student athlete (8.33%) who responded that s/he did a fall term abroad. A total of 0 student athletes responded to not going abroad in the winter, although this could be a good time to go abroad. A total of 3 student athletes (25.0%) responded that they went abroad during the spring term. A total of 8 student athletes (66.67%) responded that they went abroad during the summer.

For the student athletes who did go abroad most of them implied that the best time for a student athlete to go abroad was in the summer time, but also during winter break as well. It was expected these two terms would be

the most accommodating, simply because they are both during times when the campus is closed and classes are out of session. It would make more sense for students to take advantage of these two terms.

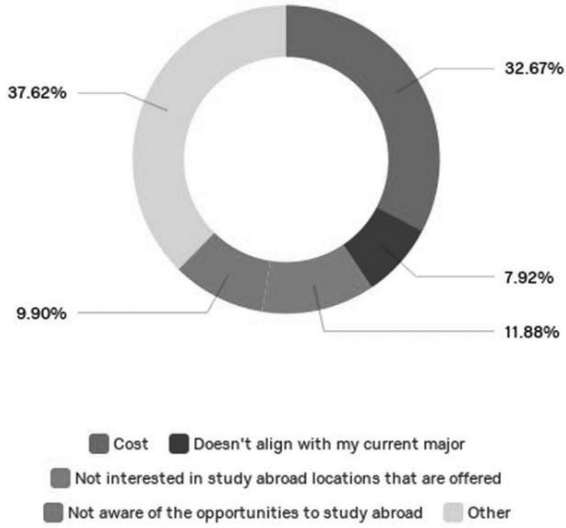

Figure 8: Reasons for Athletes Not Studying Abroad

The research that was found had a total of 33 student athletes (32.67%) responded that cost prevented them from going abroad. A total of 8 student athletes (7.92%) responded that the programs do not align with their major. A total of 12 student athletes (11.88%) responded that they were not interested in the study abroad locations offered. A total of 10 student athletes (9.90%) responded that they were not aware of the studying abroad opportunities. A total of 38 student athletes (37.62%) responded with other.

From the data on the pie chart, the two biggest issues that student athletes seem to face are cost and the programs not aligning with students' majors. This research on the topic of going abroad, indicates that cost has always been students' most difficult barrier. Depending on what school and location they go to, the study may be affordable when financial aid can cover it (Dessoff, 2006). Cost tends to be an obstacle for most students. Some athletes may see the value of going abroad despite the cost and some may believe that since it is expensive the option of going abroad is not much of a priority to them. Making sure that they are aware of all of their financial aid options when looking into going abroad could help broaden the opportunities.

Table 1: Other reasons for not Studying Abroad

Themes	Total of student responses
1. Miss their sport	6
2. Sport goes through both semesters	8
3. Not interested in going abroad period	5
4. Too busy	9
5. Workout/prepare for upcoming season	5
6. Plan to go abroad in future	8
	41

In this last question, students had to give a response to why they did not go abroad or reasons why they did not go. After analyzing all the responses, the results showed six different themes that represented all of the answers that the student athletes have given.

In this table showed the least common answers that some students had, which were all valid in their cases. The most common one was being too busy because of sport demands and academics and this confirms the existing literature.

Conclusion

This study shows student athletes on college campuses deal with barriers when it comes to studying abroad. Also, within the student athlete population, underrepresented students of color have greater disparities when it comes to studying abroad. Due to limited research on student athletes studying abroad, further research needs to be done on this topic. Future research should survey larger universities and colleges to see if there are any new challenges and obstacles that student athletes face when studying abroad. This study was conducted at a small university which may result in different challenges. The research can go beyond just student athletes, it can be applied to students of color, students that identify as LGBTQ, or students with disabilities. All these underrepresented groups have similar problems when it comes to going abroad because of the lack of support for them. We can find new and efficient ways to help these students go abroad starting with getting more supporters and people to help spread the word about the opportunities there are out there. Developing some programs geared towards

helping student athletes go abroad could be a huge step in changing the dynamics in population on who is going abroad. The options are endless and accommodating.

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University of Wisconsin, Stout Campus Climate: University Staff Job Satisfaction

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University of Wisconsin, Stout Campus Climate: University Staff Job Satisfaction

A mixed-methodology research approach was taken to understand what job aspects impact university staff job satisfaction at the University of Wisconsin, Stout (UW-Stout). First, thematic analysis of a small number of qualitative interviews produced five themes that impacted university staff job satisfaction: (1) collaboration, (2) job variability, (3) supervision, (4) compensation, and (5) daily tasks. Researchers constructed a survey to measure implicit and explicit job satisfaction of university staff based on the themes generated by the interviews. For the purpose of this study, implicit job satisfaction is the combination of factors that affect job satisfaction, such as workload, supervision quality, communication, compensation, and benefits. A job satisfaction survey was administered to measure implicit job satisfaction in this study. Explicit job satisfaction is the staff members' direct perception of their job satisfaction. A single item on the survey asked participants directly about their level of job satisfaction to measure explicit job satisfaction. A measure based on three of the five themes was also administered to examine the predictor variables for job satisfaction. This aforementioned survey was sent to all the university staff at the UW-Stout. Statistical analysis revealed a positive correlation between implicit and explicit job satisfaction of university staff. Regression models found that collaboration, supervision, and compensation predicted implicit job satisfaction, whereas supervision and compensation predicted explicit job satisfaction of university staff.

Literature Review

Employee satisfaction is a vital component in any professional organization. University staff job satisfaction is important for a university climate because university staff work in conjunction with students and faculty members. Areas in which university staff work include, but are not limited to, university dining services, institutional research, housing, recreation, and admissions. Due to the multitude of different jobs of university staff, job satisfaction can have a significant impact on the student experience at institutions of higher education (Ambrose, Huston, & Norman, 2005; Byrne, Chughtai, Flood, & Willis 2012). There can be a variety of factors that influence university staff job satisfaction, such as collaboration, job variability, supervision, compensation, and daily tasks (Spector, 1985). Due to the importance of job satisfaction for institutional performance, a study was conducted to explore various facets that can influence explicit and implicit job satisfaction for university staff at the UW-Stout.

Prior research has examined university staff with regard to factors that contribute to job satisfaction and commitment to the university. Specific job characteristics that have been examined include job security, isolation, and lack of support from the employer and peers. These characteristics contribute to low job satisfaction and low affective organizational commitment for university staff (Papinczak, 2012). Prior research has also found that departmental leadership, autonomy, expectations, work-life balance, support, and compensation predicted job satisfaction (Chung et al., 2010). More specifically, the relationships that exist between supervisors and their subordinates have been found to be an important factor in university staff satisfaction (Ambrose et al., 2005; Chung et al., 2010; Byrne et al., 2012; Filiz, 2013).

Purpose of Current Study

The current study was designed by the researchers to investigate job aspects that impact university staff job satisfaction at UW-Stout using a mixed methods approach. This research incorporated both qualitative and quantitative methods to better understand the working environment for university staff members. More specifically, qualitative interviews with university staff members informed the development of a quantitative survey. The following research question was constructed and addressed through the qualitative portion of this investigation to guide the study:

RQ1: What job aspects impact university staff job satisfaction?

Based on conclusions from the qualitative research

(Study 1), the following hypotheses were created for the quantitative portion of the research (Study 2):

H1: Explicit and implicit university staff job satisfaction will be positively related.

H2: Collaboration, supervision, and compensation will predict implicit university staff job satisfaction.

H3. Collaboration, supervision, and compensation will predict explicit university staff job satisfaction.

Study 1
Method

Participants

Four staff members, each from a different department at the UW-Stout, were contacted via email to participate in a qualitative interview regarding job satisfaction. Four staff members participated in the qualitative interviews. The staff members varied in age. Three of the four staff members identified as being male.

Measures

Qualitative Interview Protocol. The qualitative interview protocol was developed by the researchers using the steps outlined by Creswell (2009). The interview protocol was designed after reviewing and examining job satisfaction literature and previous campus climate surveys. This literature led to the development of the following protocol sections: (1) demographic information, (2) interpersonal interaction in the workplace, (3) workload, (4) compensation, (5) job security, and (6) resources. Including demographic items, a total of 17 questions were asked during each interview. An example item from the interview protocol was "Describe how your interactions with your supervisor affects your job satisfaction." Another example item was "Do you feel like you have the resources required to do your job?"

Procedure

The interviews took place from February 8, 2016 to February 16, 2016. Upon agreeing to participate in the interview, the researchers requested that their interviewees choose the meeting location. This request was made to ensure participants felt as comfortable as possible during the interview process. During each interview, the researcher introduced themselves and the purpose of the project. Next, each participant was provided with a consent form. After consenting to the interview, the

researchers proceeded with the structured interview questions. The duration of each interview was approximately 30 minutes. If the participants' answers were not typed during the interview, answers were later transcribed into a digital document with permission of participants to use audio files for such purposes.

After the interviews were completed, thematic analysis took place to analyze the responses from the interviews. The thematic analysis was based on the protocol laid out by Creswell (2009). This thematic analysis was a group process undertaken by the four researchers. In the first step of the thematic analysis, responses were themed individually from the interview with the participant, as well as interview responses from other university staff members collected by the other researchers. Thus, all four interviews were thematically analyzed by each researcher. Due to the small sample size, the researchers decided if at least two interview participants responded with a similar answer, then these responses represented a theme. For instance, if two participants responded to an item about satisfaction with professional development opportunities by mentioning that their supervisor encouraged professional development, then "supervisor encouragement of professional development" was considered a theme.

In the second step, after the individual thematic analysis, the researchers came together to compare themes. Again, due to the small sample size, if two or more researchers had similar themes, this was considered a theme for university staff job satisfaction at the UW-Stout. Thus, disagreement was avoided by taking a majority rule approach. If researchers had similar themes named differently, the other researchers were asked for their preference of theme name.

In the third step, the researchers analyzed the themes that had been agreed upon to see if these themes clustered into overarching themes. These overarching themes were considered to be the main themes for job satisfaction of staff members at the UW-Stout. There were five main themes that emerged from the group analysis. These themes were collaboration, job variability, supervision, compensation, and daily tasks. University police and open departmental access are examples of themes that fit in the collaboration main theme. Role variability and task variability are examples of themes that fit in the job variability main theme. Supervisor encouragement of professional development opportunities and receptive to employee feedback are examples of themes that fit in the supervision main theme. Insurance in benefit package and benefit package has not changed are examples of themes that fit in the compensation main theme. Finally, emailing and meetings are examples of themes that fit in the daily tasks main theme.

Results

The thematic analysis conducted by the researchers revealed five overarching themes: collaboration, job variability, supervision, compensation, and daily tasks. Each staff member reported overall satisfaction with their position at the UW-Stout. More specifically, they expressed satisfaction with the level of collaboration within and between departments. The supervision theme also revealed that participants were mostly satisfied with supervisor. In addition, there was agreement that a positive relationship with supervision is important. Each participant also suggested that their job varied. This variation could be positive or negative depending on the participants' knowledge of their role and job tasks, as well as their level of adaptability to change. As mentioned, another theme that emerged during the qualitative interview was compensation. In general, the participants were satisfied with their compensation. However, it was clear that any sort of decrease in benefits was viewed unfavorably by the participants. The final aforementioned theme was daily tasks. For the most part, participants reported having consistent daily tasks (e.g., e-mails and meetings), as well as variability throughout their days. Specific examples of each theme are included in the following tables in the form of direct quotes.

Interview Theme 1	Collaboration
• *Unique office. Independent work. No overlap, but we help each other. Not a lot of interaction aside from meetings. Tone of meetings can be influenced by people's mood in the office.*	
• *We always look out for one another. People help with picking up the slack.*	
• *In my job, I work with all departments.*	
• *I think I've gotten a lot of experiences being on campus-wide committees…*	

Table 1 Collaboration examples

Interview Theme 2	Job Variability
• *The work here changes a lot. Commonly working on performance indicators, moving from pdf format to tableau. Understanding the programs. Getting information on to the website. Beginning of semester, most time is taken up by engagement session planning followed by debriefings after the sessions. Very project specific. 30% of time spent responding to emails, 30% attending meetings, and 60% working on projects.*	
• *Every day is a little different depending on what projects we are working on – and what additional evaluations we are working on. Some days I start with emailing colleges, phone calls, etc.*	
• *A lot of times when things happen it has to happen really fast.*	
• *But I think the way in which a supervisor communicates with me either helps me be more successful or hinders my abilities to be as successful.*	

Table 2 Job variability examples.

Interview Theme 3	Positive Supervisor Experience
• *The director really encourages professional development.*	
• *My supervisor wants to know us on a personal and professional level. One-on-ones to talk about work and life.*	
• *I think that my supervisor has a really good method of leading our team.*	
• *Even if you're good at it, things pop up unexpectedly that can't be planned for.*	

Table 3 Positive supervisor experience examples.

Interview Theme 4	Compensation
• *If any one piece decreased it would not be good. Enjoys the retirement match, good healthcare pay, would choose this one over others.*	
• *Would add something related to tuition reimbursement to either push for more education or pay off some loans. Being able to work from home would increase satisfaction.*	
• *I would make it more competitive with other universities.*	
• *Compensated for not taking the benefits package.*	

Table 4 Compensation examples.

Interview Theme 5	Daily Tasks
• *Very project specific. 30% of time spent responding to emails, 30% attending meetings, and 60% working on projects.*	
• *Every morning I go through my to-do list checking email inbox to determine what tasks are still ending to be completed.*	
• *Well everyday there is a lot of emailing involved, usually that is how I start the day. There is usually meeting in there that I have to attend...*	
• *Every day is a little different depending on what projects we are working on...*	

Table 5 Daily tasks examples.

Study 2
Method

Participants

The participants for this study were obtained through an electronic survey that was emailed to all 530 UW-Stout staff members that the Senate of Academic Staff had email addresses for. The final sample was comprised of 133 participants, 73 females and 36 males. Approximately half of the participants had been employed at the UW-Stout for 10 years or less (50.34%). The following percentages represent the amount of participants born in each decade from the 1940s to 1990s: 1940s (0.75%), 1950s (13.53%), 1960s (20.30%), 1970s (16.54%), 1980s (13.53%), and 1990s (2.26%). Participants were from the following divisions: College of Arts, Humanities, and Social Sciences (5.26%), College of Education, Health,

and Human Sciences (9.02%), College of Management (0.75%), College of Science, Engineering, and Mathematics (4.51%), Administrative and Student Life Services (21.81%), Academic and Student Affairs (16.54%), and Chancellor's Division (14.29%). Participants were from over 25 departments. The top three departments in terms of participation in the survey were the Physical Plant (10.53%), Student Life Services (7.52%), and Learning Information and Technology (6.77%).

Measures

The campus climate survey that was administered to the university staff at the UW-Stout was developed, in part, by the researchers. There were three components to this survey: implicit job satisfaction, explicit job satisfaction, and predictors of job satisfaction. The job satisfaction survey developed by Spector (1985) was utilized to measure implicit job satisfaction because items in the job satisfaction survey assess specific dimensions of job satisfaction, which is opposed to directly asking the participants about their job satisfaction. More specifically, the job satisfaction survey is a 36-item measure that assesses employee perceptions of attitudes toward nine dimensions of their job. These nine dimensions are pay (α = .86), promotion ($\alpha\beta$ = .86), supervision (α = .90), fringe benefits (α = .79), contingent rewards (α = .80), operating procedures (α = .64), coworkers (α = .72), nature of work (α = .74), and communication (α = .81). Subscales were comprised of four items each. Each item in the job satisfaction survey was measured on a 6-point scale (1 = *strongly disagree* to 6 = *strongly agree*).

Since the job satisfaction survey is intended to obtain perceptions about implicit factors that influence job satisfaction, one item was developed by the researchers to examine explicit job satisfaction. This item measured explicit job satisfaction by directly inquiring about participants' job satisfaction. This item was, "Overall, I am satisfied with my experience as an employee here thus far." This item was measured on a 6-point scale (1 = *strongly disagree* to 6 = *strongly agree*).

The measure for the predictors was also developed by the researchers. To develop this measure, items were constructed based on the five themes that emerged from the thematic analysis of qualitative interviews with the UW-Stout staff, which were collaboration, job variability, supervision, compensation, and daily tasks. These five themes were represented by the five subscales in the predictor measure. The measure consisted of 36 items. Responses to each item were made on a 6-point scale (1 = *strongly disagree* to 6 = *strongly agree*). There were 11 items for collaboration (α= .83), six for job variability (α = .07), nine for supervision

(α= .89), four for compensation (α = .73), and six for daily tasks (α = .31). Due to the low internal consistency scores, data obtained with the job variability and daily tasks subscales were not utilized for the quantitative analyses. Composite scores were created for the remaining three subscales by summing scores from each item in the subscales.

Procedure

The Senate of Academic Staff at the UW-Stout distributed the survey via e-mail to the 530 UW-Stout employees. The survey was hosted on Qualtrics, an online survey platform. The data collection period took place from April 1, 2016 to April 10, 2016. First, the participants were provided with an informed consent page, which reminded them that they could exit the survey at any time without repercussion and let the participants know about the benefits and costs of participating in the research. If the individual elected to not participate in the study, then they were taken to a screen that thanked them for their time. If the individual did elect to participate in the study, then that participant was taken to the survey. The survey began with the job satisfaction survey measure and the item developed to measure explicit job satisfaction. Next, the participants were presented with the measure that the researchers developed based on thematic analysis of qualitative interviews with the UW-Stout staff. The last part of the survey consisted of demographic items. After participants completed the survey, they were taken to a screen that thanked them for their time.

Results

Prior to testing the hypotheses, mean scores were obtained for both explicit and implicit job satisfaction of university staff. The average score for explicit job satisfaction was 4.31 (*SD* = 1.23). The average score for implicit job satisfaction was 3.79 (*SD* = 0.73). These means and the standard error of the means for implicit and explicit job satisfaction are presented in Figure 1.

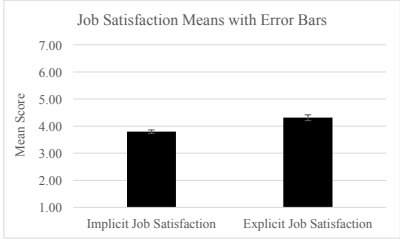

Figure 1. Job satisfaction averages with error bars.

Regression models were utilized to test the hypotheses. However, before testing the hypotheses, the statistical assumptions of regression

models were tested to ensure that regression analyses were appropriate for analyzing the data. More specifically, the assumptions of homoscedasticity and normality of residuals were tested for each of the regression models. Homoscedasticity is the assumption that values around the regression line are approximately equal in variance. Normality of residuals is the assumption that errors are normally distributed in a regression line. P-P Plots, which display the values around the regression line, utilized z-scores for residuals and predictors for two regression models to test these assumptions. Both assumptions were met. Thus, there was no tendency for error in either regression model. For both regression models, collaboration, supervision, and compensation were set as predictors. The first regression model was created to predict implicit job satisfaction. The second regression model was created to predict explicit job satisfaction.

Before the regression models were run, a bivariate correlation was conducted to see if implicit and explicit job satisfaction were related. Based on this analysis, implicit job satisfaction was positively associated with explicit job satisfaction, $r = .74$, $p < .001$. Thus, the first hypothesis was confirmed.

To test the second and third hypotheses, composites for collaboration, supervision, and compensation were utilized to predict implicit job satisfaction and explicit job satisfaction. These composites were created by summing items in each subscale. The first regression model explained 79% of variance for implicit job satisfaction ($R = .89$, $F(3, 124) = 159.45$, $p < .001$). Collaboration significantly predicted implicit job satisfaction ($\beta = .31$, $p < .001$). Supervision also significantly predicted implicit job satisfaction ($\beta = .31$, $p < .001$). Compensation was another significant predictor of implicit job satisfaction ($\beta = .32$, $p < .001$). Thus, the second hypothesis was also confirmed.

The second regression model explained 57% of variance for explicit job satisfaction ($R=.75$, $F(3, 124) = 53.66$, $p < .001$). Supervision significantly predicted explicit job satisfaction ($\beta =.51$, $p < .001$). Compensation also significantly predicted explicit job satisfaction ($\beta = .55$, $p < .001$). However, collaboration ($\beta = .22$, $p = .076$) did not predict explicit job satisfaction. Thus, the third hypothesis was partially supported.

As part of an exploratory analysis, means of sums for subscales in the job satisfaction survey were obtained for the UW-Stout and general United States (U.S.) higher education norms, which were obtained from Spector (2011). Figure 2 presents means of sums for subscales in the job satisfaction survey. In general, these scores were similar for the UW-Stout and U.S. higher education norms. Figure 3 presents means of sums for overall scores

from the job satisfaction survey. The University of Wisconsin, Stout was similar to the U.S. higher education norms in overall job satisfaction.

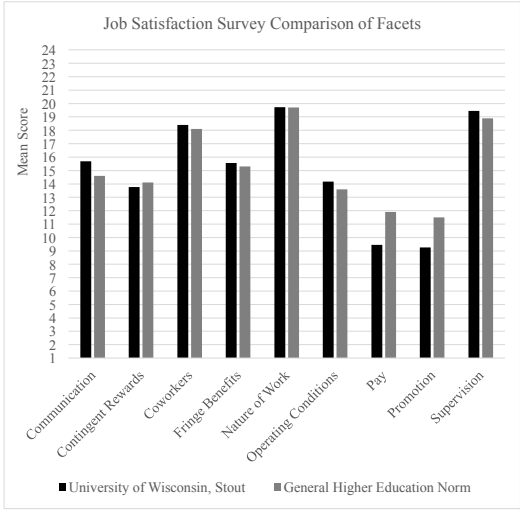

Figure 2. Job satisfaction survey comparison of facets.

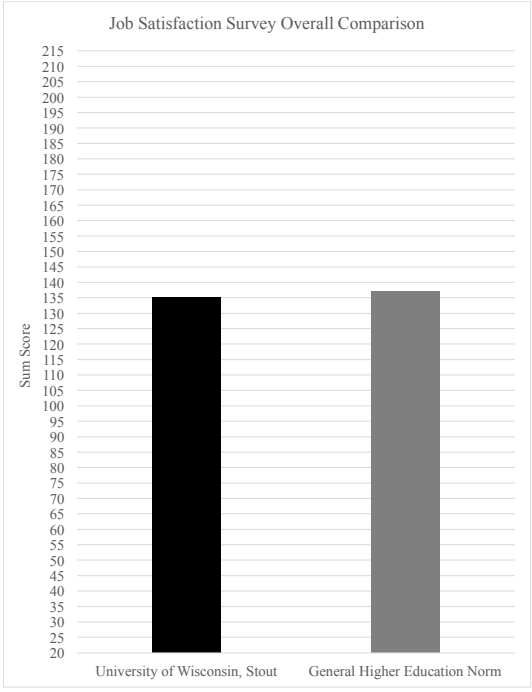

Figure 3. Job satisfaction survey overall comparison.

Discussion

Based on the results of the study, it can be concluded that university staff at the UW-Stout feel generally satisfied with their jobs. Employees feel that the university treats them well and supports their positions. The University of Wisconsin, Stout is also seen by university staff as having an effective and positive work environment, which may contribute to the university's success and productivity. Of the five themes identified from the staff interviews, supervision and compensation emerged as the most impactful characteristics of university staff job satisfaction due to being predictors of both implicit and explicit job satisfaction.

Supervision was viewed by university staff as one area that greatly affected their job satisfaction. Employees noted that they typically had a positive working experience with their supervisors and that administration is receptive to feedback. This positive experience for university staff led to higher job satisfaction levels. However, a standardized way for university employees to offer feedback to their supervisors does not currently exist at the UW-Stout. In general, administering employee feedback has been at the discretion of each department. A campus-wide system can ensure that each employee has an opportunity to offer feedback to their supervisors, which may lead to a better working relationship between supervision and employees. In turn, this feedback system can foster better job satisfaction for academic staff employees.

Compensation also had a significant impact on university staff job satisfaction. If university staff feel adequately compensated they may be satisfied with their jobs. At this time, an increase in salaries is unlikely at the UW-Stout, and within the UW-System, due to the budgetary restrictions imposed across the State of Wisconsin education system. However, the majority of those surveyed indicated that they recognized that a monetary increase is not feasible. Therefore, in place of monetary increases, university administration should explore possible fringe and non-monetary benefits to increase university staff job satisfaction.

Daily tasks, job variability, and collaboration were other components of job satisfaction identified in this research, so the UW-Stout administration may want to investigate new ways to improve satisfaction in these areas across the campus. Supervision and compensation were however the most prominent of the findings in this research, and this indicates that the UW-Stout should ensure supervisors across the campus have the tools and training necessary to provide quality leadership in their respective offices and departments. In addition, the university should make attempts to provide compensation adjustments when possible. It is expected that efforts aimed

at both supervision and compensation will be the most direct method for addressing and increasing university staff morale.

Limitations

A few limitations from the study should be noted. First, only four university staff interviews were performed during the qualitative research component of the study. Therefore, not all divisions and departments were represented in these interviews, nor did the interviewees represent a large proportion of the UW-Stout university staff population. Second, not all of the departments were represented in the survey data. In addition, some divisions and departments were overrepresented or underrepresented by the data. This sample representativeness limitation may have been due to a lack of campus awareness regarding the current study. Finally, self-reported data was collected for the survey. Therefore, it is possible that there are inaccuracies in the data due to self-serving biases.

Future Directions

Future investigations into the satisfaction of university staff should be designed to include more departments in the qualitative interviews. This will aid in capturing diverse satisfaction perspectives from across the campus and will better inform quantitative measure development. In addition to taking steps to increase inclusion in the interview process, future investigations should attempt to reach university departments and divisions that were underrepresented in this research. In taking these steps, a future study of university staff satisfaction will more clearly capture campus climate experiences and better aid in developing effective and meaningful campus interventions for improving satisfaction.

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Artificial Constructions

Jacob Docksey

Senior B.F.A. in Studio Art, painting concentration, Business Administration Minor

When fishing in fresh water it is common to use a jig and hook to catch a variety of fish. For example, with the same tackle one may catch a bass, walleye, or catfish without ever changing one's lure. A jig is a rubber body which is penetrated and slid around the hook with the function of mimicking the fishes' prey while also hiding the metal hook. My work is about the interaction between technology and nature which occurs both in coinciding events and devastating interruptions.

With the world currently projectable from flashing screens to the comforts of one's couch, the globe has shrunk to the size of a television remote or smart phone. It is now possible to experience nature superficially with no work or sweat, as one can see the mysteries of the ocean or rainforest while ordering extra cheese and a carbonated beverage. As a millennial born in the Midwest I have seen how technology's advances distract humans from the natural world with the luxury of illuminated devices like computer screens. My paintings utilize this idea of replacement by mimicking natural systems with manmade materials. By collecting found objects once used for industrial or technical purposes, I create dioramas that represent natural systems like reproduction, migration, and invasive species. For the installation process of these artificial constructions I focus on structure and lighting to create dramatic compositions.

When picking found objects to work from I prefer to let fortune guide my collection. I do this by remaining observant through my travels to and from the studio, and allow moments of visual excitement and coincidence to influence the objects I select. By waiting for the objects to come forth instead of overtly searching, my decision in retaining them becomes more genuine and nostalgically guided. Reflecting on the materials I have up to this point I believe memories from my past carry significance to the spark felt when discovering a new object. This "spark" moment is something I aim for when constructing my installations, and feel it only returns if my installations form believable functionality.

Moments of absurdity occur in my painting through abstraction held in previous layers that disrupt the final representation of space. Another way my work portrays impossibilities is by subtracting physical properties from a structural object. Both of these mysterious elements can be seen in "The Fishing Channel." One taking place under the stool in the form of a bright

mysterious collage of local colors, and the other in the removal of the table's fourth leg which, nevertheless, still creates a cast shadow.

My approach to painting embraces art history, including impressionism's commitment to observation and the absurdity of the surrealisms concepts and visual metaphors. The function of looser, expressive paint application is important in creating depth as well as capturing a specific moment. The linear quality of some objects helps me evoke a sense of unseen larger spaces in the compositions. For instance, the hose in "Siphon" and "The Aquarium" enters and exits the work through walls, under doors, or into objects, suggesting adjacent rooms and expanded space, hence the viewer can fill in space with their own notion. I aim to lead my audience through a universe that has moments of both clarity and question, where technology has been re-assigned new functions that hold metaphorical formulas for the viewer to unravel.

http://jacobtdocksey.weebly.com/work.html

"*Siphon,*" 2016, oil on canvas, 3'x4'

"*Call Mom and Tell Her the Basement Flooded,*" 2016, oil on Canvas 1'6" x 1'6"

"*The Aquarium,*" 2016, oil on canvas, 1'10" x 2'3"

"*Heatwave,*" 2016, oil on canvas, 3'x 3'

In Loving Memory

Mackenzie Catton[1]

Senior BFA Studio Art, Painting Concentration, Art History Minor

I am reborn a woman, time and time again, morning by morning, in my birthing vessels that shelter ephemeral scraps of remembrance, lingering on the edge of futile reconstruction and forgottenness.

Through a habit of hoarding and fetishizing over objects that remind me of the past, I try to pin down transient memories remembered and partially forgotten that construct the personal presence of my womanhood and femininity. I use self-portraiture, still lives assembled from familiar kitsch objects, and domestic spaces to view my work through the lens of my grandparents' house.

I explore my own construction of femininity in relation to a new discovery of sexuality that seems to contradict an appearance of innocence. An overwhelming pink glow surfaces from my childhood bedroom and a bedroom from my grandmother's house deemed "The Pink Room." My work addresses this oppressive pink and muted pastels from the 1950s as a means to show sentimentality towards the particular representation of femininity from my grandmother's time, while making sense of a new expression of sexuality. Objects that remind of my grandmother become bodily female signifiers, as well as vessels or wombs for nurturing my ideas of womanhood. Kitsch objects that harbor nostalgia become actors on a domestic stage for the considerations of femininity and sexuality. These entities find themselves at odds in our culture, but my work questions their dichotomy.

My work is influenced by Laurie Simmons' photography work, which captures a brand of femininity typical of the 1950s. Her work shows an ambiguous relationship with the roles and representation of women from that time period. I find affinity with the way she speaks of objects as taking on personalities of their own in a time of materiality. Materiality grounds us in a fleeting world of change. Simmons' use of dolls and dollhouse furniture from the 1950s is "less about the act of playing and more about the re-creation of a sense of visual memory or history" (Laurie Simmons). These objects to which I find myself attracted become a means of recreation. Thus, I deeply connect with the inexplicable sadness of Simmons' work that registers on a personal level.

Speaking through a language of contrived marks, I find myself lovingly pouring over objects of my past that remind of my grandparents' house. Through over-articulation, I obsess over my paintings to the point of a dead-

1 Mackenzie is in the Honors College of UW-Stout (Ed.).

ened quality. Symmetry structures many of my works, making them static through use of verticals and horizontals to emphasize my frustration with the dynamic nature of change. Looking to ground myself through my memories, my work distorts the realities of my past into new amalgamations that seem familiar, but will never replicate the past. Yet, out of the deadness of preciousness and sentimentality, I seek to preserve and breathe new life into what will never be the same.

And so I am reborn a woman, time and time again. Yet, have I changed?

https://mackenziecatton.wordpress.com/
http://www.mnartists.org/mackenziecatton

Toilette II, 2016, oil on panel, found objects, 23” x 24”

Toilette, 2016, vanity mirror, carved soap, lavender scent, 78” x 30”

Purse, 2016, oil on panel, 9” x 12”

The Pink Room, 2016, oil on canvas, 33” x 28”

Translations

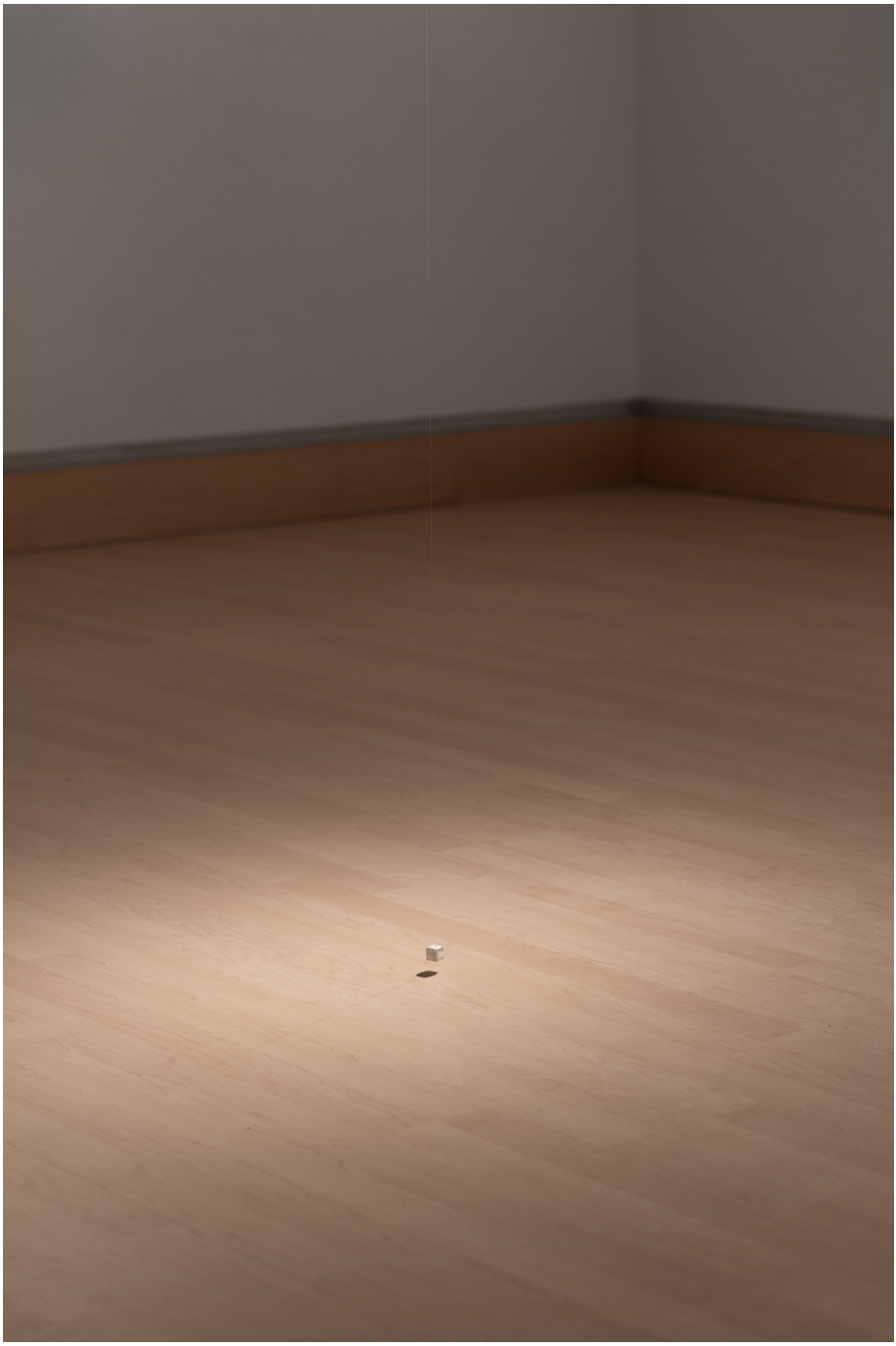
Collin Stremke

Senior, Fine Art

This series of work is an exploration into the drive of curiosity and understanding through the manipulation of perception and communication. The perpetual necessity to learn, explore and investigate has always been the foundation of who I am and why I create; this curiosity and determination to grow has become the main focus and driving force in my practice. Through the manipulation of light, space, and materiality I create experiential moments encompassed by a hidden index of knowns and unknowns. I want the viewer to be drawn to the result of why I make and to interpret what that piece means through their eyes and experiences. Most importantly, I hope the viewer takes away a subconscious memory of the desire to understand and the allowance of curiosity to take hold.

Untitled, acrylic, pure silver leafing, black pigment, steel
3 ¾” x 1 ½” x 44”, 2016

Untitled, acrylic, pure silver leafing, black pigment, steel
3 ¾” x 1 ½” x 44”, 2016



Strive, ½” x ½” x ½” cube, gallery paint, monofilament
½” x ½” x (ceiling height), 2015

Felis catus / Albus, Nebelung cat hair, acrylic, aluminum
5” x 5” x 20”, 2016

TRESPASS

Robert Martin

Senior, BFA in Studio Art

Drawing has the power to construct such an honest relationship between artist and observer. In its traditional and most foundational sense, drawing is an observational and communicative assembly of mark-making. Drawing as an art practice is transparent, leaving a history of work throughout its processes. I appreciate it as the most cartographic of the disciplines. My art practices are deeply rooted in this attraction to traditional drawing. However, I recognize that this tradition is equally reciprocated with potential. My relationship with contemporary sculpture has removed any notions of drawing as some sort of archaic practice. With heightened spatial understanding through dimensional creation, I apply elements extending beyond the factors occurring just on substrate. Exploring drawing beyond the second dimension with sculptural considerations has the power to intensify the practice into a situation more immersive and layered. This blending of disciplines is strengthened by the multi-faceted nature of my artistic content.

Intersectionality is the future of introspective art-making. Intersectionality describes the connected but diverse nature of an individual or group's social categorizations. In recognizing our own multi-faceted backgrounds and our interconnectedness we celebrate difference and establish community. The creative works I produce are channeled through the various lenses of my identity – as a homosexual, as a Midwesterner, as a Catholic-raised agnostic – and are applied with intentional nuance. I focus my practice from a lived perspective.

Homosexuality in particular is a prevalent factor in my life and thus experiences concerning this categorization inform my content powerfully. The perspective gained from this identity is deepened by the dissonance it shares with a conservative Catholic upbringing. I investigate the ways religion has employed art and architecture in evoking awe. Additionally, I am attracted to trends in iconography throughout the Italian Renaissance, and the symbolism which communicated what words could not in a period where imagery was just as crucial to instructing religion as the holy text. Beyond these fascinations though, I struggle with the shaming nature of "sin" and the denial of individuals into proposed "kingdoms of heaven" based solely on social categorizations such as sexual orientation. Most often, I am overlapping religious influence with queer subjects and themes.

The Catholic upbringing that I experienced occurred in homes decked to their popcorn ceilings in Midwestern kitsch. Nothing is more Wisconsin

than a generously matted Thomas Kinkade or Terry Redlin print above a fireplace. Fantasy moments of large deer jumping high over wood fences and pheasants flying up from harvested corn fields are, to many, what fine art is. I challenge myself to address this aspect of my upbringing by pulling this sort of imagery, and other Midwestern symbolism, into a contemporary art practice. Currently, I am exploring male cardinals (flamboyant and distinguishable from females) as subjects to speak subtly of homosexuality under a perceivable guise of wildlife art. I am using the Catholic stages of the cross to organize compositions within a timeline ending in condemned death. Often patterns of wood grains, ferns, and other regional flora occupy my compositions. The works I've produced provide insight and direction as I move toward my senior solo exhibition, TRESPASS.

www.rmsculpture.com

Katillac, 2016, Ink, watercolor, colored pencil
6” x 10”

Sandra, 2016, Ink, watercolor, colored pencil
6” x 10”

Denial, 2016, florescent light, crystal, wood, smoked glass,
polymer clay, acrylic paint, yellow stain
installation (framed window stands 6')

Brick, 2016, cement, polymer clay, acrylic paint, human hair
5” x 5” x 6”